Catalyst 3750-E and Catalyst 3560-E Switch Hardware Installation Guide

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CONTENTS

Preface vii

Audience vii

Purpose vii

Conventions vii

Related Publications viii

Obtaining Documentation, Obtaining Support, and Security Guidelines ix

CHAPTER 1 **Product Overview** 1-1

Switch Models 1-1

Front Panel Description 1-2

10/100/1000 Ethernet Ports 1-4

PoE Ports 1-4

10-Gigabit Ethernet Module Slots 1-5

Cisco TwinGig Converter Module 1-5

SFP Modules 1-5

LEDs 1-6

System LED 1-7

RPS LED 1-8

Master LED 1-8

Power Supply LEDs 1-8

Fan LED 1-9

Port LEDs and Modes 1-9

PoE LED 1-11

Stack LED 1-12

Rear Panel Description 1-13

StackWise Ports 1-14

Power-Supply Modules 1-15

24- and 48-Port Switch Power-Supply Modules 1-15

Catalyst 3560E-12D and 3560E-12SD Switch Power-Supply Modules 1-16

Fan Modules 1-17

RPS Connector 1-19

Management Ports 1-20

Management Options 1-20

Network Configurations 1-21

CHAPTER 2 **Switch Installation** 2-1

Preparing for Installation 2-1
Safety Warnings 2-1
Installation Guidelines 2-5
Box Contents 2-6
Tools and Equipment 2-6
Planning a Switch Stack (Catalyst 3750-E Switches) 2-6
Switch Stacking Guidelines 2-6
Stack Cabling Configurations 2-7
Stack Bandwidth and Partitioning Examples 2-8
Power On Sequence for Switch Stacks 2-9
Installing the Switch 2-10
Rack-Mounting 2-10
Attaching the Rack-Mount Brackets 2-12
Mounting the Switch in a Rack 2-14
Wall-Mounting 2-15
Attaching the Brackets to the Switch for Wall-Mounting 2-15
Mounting the Catalyst 3560E-12D Switch on a Wall 2-16
Table- or Shelf-Mounting 2-17
After Installing the Switch 2-17
Connecting to the StackWise Ports (Catalyst 3750-E Switches) 2-18
Installing Devices in the 10-Gigabit Ethernet Slots 2-19
Installing X2 Transceiver Modules and Converter Modules 2-19
Removing an X2 Transceiver Module or Converter Module 2-22
Installing SFP Modules 2-22
Installing an SFP Module 2-23
Removing an SFP Module 2-25
Connecting Devices to the Ethernet Ports 2-25
10/100/1000 Ethernet Port Connections 2-26
PoE Port Connections 2-26
Where to Go Next 2-28

CHAPTER 3 **Power Supply and Fan Module Installation** 3-1

Installation Overview 3-1
Tools and Equipment 3-1
Installation Guidelines 3-1
Installing an AC-Power Supply 3-3
Installing a DC-Power Supply 3-4

Preparing for Installation 3-5
Grounding the Switch 3-5
Installing the DC Power Supply in the Switch 3-8
Wiring the DC-Input Power Source 3-9
Installing a Fan Module 3-10

CHAPTER 4 **Troubleshooting** 4-1
Diagnosing Problems 4-1
Check Switch POST Results 4-1
Check Switch LEDs 4-2
Check Switch Connections 4-2
Bad or Damaged Cable 4-2
Ethernet and Fiber Cables 4-2
Link Status 4-2
PoE Connections 4-3
Transceiver Issues 4-3
Port and Interface Settings 4-3
Ping End Device 4-4
Spanning Tree Loops 4-4
Check Switch Performance 4-4
Speed, Duplex, and Autonegotiation 4-4
Autonegotiation and NIC Cards 4-5
Cabling Distance 4-5
How to Clear the Switch IP Address and Configuration 4-5
Finding the Switch Serial Number 4-6
How to Replace a Failed Stack Member 4-6

APPENDIX A **Technical Specifications** A-1

APPENDIX B **Connector and Cable Specifications** B-1
Connector Specifications B-1
10/100/1000 Ports B-2
10-Gigabit Ethernet Module Interfaces B-2
SFP Modules B-3
10/100 Ethernet Management Port B-4
Console Port B-4

Cable and Adapter Specifications B-5
10-Gigabit Ethernet X2 Transceiver Module Cable Specifications B-5
SFP Module Cable Specifications B-6
Four Twisted-Pair Cable Pinouts B-7
Two Twisted-Pair Cable Pinouts B-8
Identifying a Crossover Cable B-9
Console Port Adapter Pinouts B-9

APPENDIX C **Configuring the Switch with the CLI-Based Setup Program** C-1
Accessing the CLI C-1
Accessing the CLI Through Express Setup C-1
Accessing the CLI Through the Console Port C-1
Connecting to the Console Port C-2
Entering the Initial Configuration Information C-2
IP Settings C-2
Completing the Setup Program C-3

INDEX

Preface

Audience

This guide is for the networking or computer technician responsible for installing Catalyst 3750-E and Catalyst 3560-E switches. We assume that you are familiar with the concepts and terminology of Ethernet and local area networking. If you are interested in more training and education in these areas, learning opportunities including training courses, self-study options, seminars, and career certifications programs are available on the Cisco Training & Events web page:

http://www.cisco.com/web/learning/index.html

Purpose

This guide documents the hardware features of the Catalyst 3750-E and Catalyst 3560-E series switches. It describes the physical and performance characteristics of each switch, explains how to install a switch, and provides troubleshooting information.

This guide does not describe system messages that you might receive or how to configure your switch. For more information, see the switch getting started guide, the switch software configuration guide, the switch command reference, and the switch system message guide on the Cisco.com Technical Support and Documentation home page. For information about the standard Cisco IOS Release 12.1 or 12.2 commands, see the Cisco IOS documentation set from the Cisco.com home page at **Technical Support and Documentation > Documentation**. On the Cisco Documentation home page, select Release **12.1** or **12.2** from the Cisco IOS Software drop-down list.

Conventions

This document uses the following conventions and symbols for notes, cautions, and warnings. Translations of the warning statements in this document appear in the *Regulatory Compliance and Safety Information for the Catalyst 3750-E and Catalyst 3560-E Switch* that ships with the switch.

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warning **This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.** Statement 1071

Related Publications

Before installing, configuring, or upgrading the switch, see the release notes on Cisco.com for the latest information.

These documents provide complete information about the switch and are available from these Cisco.com sites:

http://www.cisco.com/en/US/products/ps7077/tsd_products_support_series_home.html

http://www.cisco.com/en/US/products/ps7078/tsd_products_support_series_home.html

- *Catalyst 3750-E Switch Getting Started Guide*
- *Catalyst 3560-E Switch Getting Started Guide*
- *Regulatory Compliance and Safety Information for the Catalyst 3750-E and Catalyst 3560-E Switch*
- *Release Notes for the Catalyst 3750-E and Catalyst 3560-E Switch*
- *Catalyst 3750-E and Catalyst 3560-E Switch Software Configuration Guide*
- *Catalyst 3750-E and Catalyst 3560-E Switch Command Reference*
- *Catalyst 3750-E and Catalyst 3560-E Switch System Message Guide*
- *Cisco Software Activation and Compatibility Document*
- *Documentation Updates for the Catalyst 3560E-12D Switches*
- *Installation Notes for the Catalyst 3750-E, Catalyst 3560-E Switches, and RPS 2300 Power Supply Modules*
- *Installation Notes for the Catalyst 3750-E and Catalyst 3560-E Switch Fan Module*
- *Installation Notes for the Cisco TwinGig Converter Module*
- *Cisco Redundant Power System 2300 Hardware Installation Guide*
- *Cisco Redundant Power System 2300 Compatibility Matrix*
- Device manager online help (available on the switch)

These compatability matrix documents are available from this Cisco.com site:

http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

- *Cisco Gigabit Ethernet Transceiver Modules Compatibility Matrix*
- *Cisco 100-Megabit Ethernet SFP Modules Compatibility Matrix*
- *Cisco Small Form-Factor Pluggable Modules Compatibility Matrix*
- *Compatibility Matrix for 1000BASE-T Small Form-Factor Pluggable Modules*

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

CHAPTER 1

Product Overview

The Catalyst 3750-E and Catalyst 3560-E family of switches, also referred to as the *switch*, are Ethernet switches to which you can connect devices such as Cisco IP Phones, Cisco Wireless Access Points, workstations, and other network devices such as servers, routers, and other switches.

The Catalyst 3750-E switches support stacking through Cisco StackWise technology. The Catalyst 3560-E switches do not support switch stacking. Unless otherwise noted, the term *switch* refers to a standalone switch and to a switch stack.

This chapter provides a functional overview of the Catalyst 3750-E and Catalyst 3560-E switches and covers these topics:

- Switch Models, page 1-1
- Front Panel Description, page 1-2
- Rear Panel Description, page 1-13
- Management Options, page 1-20

Switch Models

Table 1-1 and Table 1-2 describe the switch models.

Note All switch models support the Cisco TwinGig Converter Module.

Table 1-1 Catalyst 3750-E Switch Models

Switch Model[1]	Part Number	Description
Catalyst 3750E-24	WS-C3750E-24TD	24 10/100/1000 Ethernet ports, 2 10-Gigabit Ethernet X2 module slots
Catalyst 3750E-48	WS-C3750E-48TD	48 10/100/1000 Ethernet ports, 2 10-Gigabit Ethernet X2 module slots
Catalyst 3750E-24 PoE[2]	WS-C3750E-24PD	24 10/100/1000 PoE ports, 2 10-Gigabit Ethernet X2 module slots

Table 1-1 Catalyst 3750-E Switch Models (continued)

Switch Model[1]	Part Number	Description
Catalyst 3750E-48 PoE	WS-C3750E-48PD	48 10/100/1000 ports with 370 W of PoE, 2 10-Gigabit Ethernet X2 module slots
Catalyst 3750E-48 PoE	WS-C3750E-48PD Full Power	48 10/100/1000 ports with 740 W of PoE, 2 10-Gigabit Ethernet X2 module slots

1. All Catalyst 3750-E switches support Cisco StackWise technology.
2. PoE = Power over Ethernet

Table 1-2 Catalyst 3560-E Switch Models

Switch	Part Number	Description
Catalyst 3560E-24	WS-C3560E-24TD	24 10/100/1000 Ethernet ports, 2 10-Gigabit Ethernet X2 module slots
Catalyst 3560E-48	WS-C3560E-48TD	48 10/100/1000 Ethernet ports, 2 10-Gigabit Ethernet X2 module slots
Catalyst 3560E-24 PoE	WS-C3560E-24PD	24 10/100/1000 PoE ports, 2 10-Gigabit Ethernet X2 module slots
Catalyst 3560E-48 PoE	WS-C3560E-48PD	48 10/100/1000 ports with 370 W of PoE, 2 10-Gigabit Ethernet X2 module slots
Catalyst 3560E-48 PoE	WS-C3560E-48PD Full Power	48 10/100/1000 ports with 740 W of PoE, 2 10-Gigabit Ethernet X2 module slots
Catalyst 3560E-12D	WS-C3560E-12D	12 10-Gigabit Ethernet X2 module slots
Catalyst 3560E-12SD	WS-C3560E-12SD	12 SFP[1] module slots, 2 10-Gigabit Ethernet X2 module slots

1. SFP = small form-factor pluggable

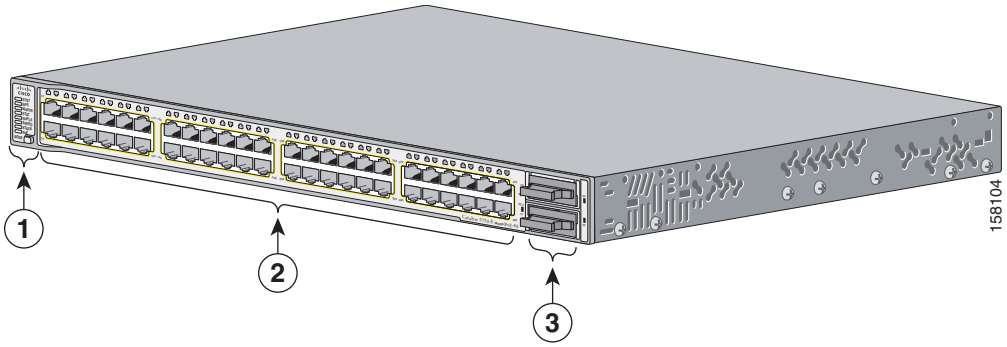
Front Panel Description

The 24- and 48-port switch front panels include the 10/100/1000 Ethernet ports or the 10/100/1000 PoE ports, the 10-Gigabit Ethernet module slots, and the switch LEDs, as shown in Figure 1-1, and described on the following pages. Figure 1-1 shows the Catalyst 3750E-48 PoE switch as an example. All the 24- and 48-port switches have similar components.

The Catalyst 3560E-12D switch front panel includes the 10-Gigabit Ethernet module slots and the switch LEDs, as shown in Figure 1-2, and described on the following pages.

The Catalyst 3560E-12SD switch front panel includes the SFP module slots, the 10-Gigabit Ethernet module slots, and the switch LEDs, as shown in Figure 1-3, and described on the following pages.

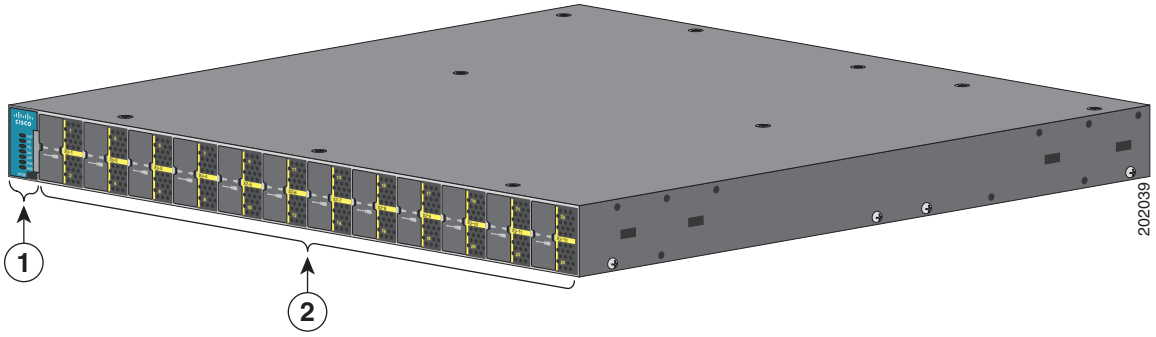
Figure 1-1 24- and 48-Port Switch Front Panel



1	Mode button and switch LEDs	**2**	10/100/1000 Ethernet ports or 10/100/1000 PoE ports[1] and port LEDs
3	10-Gigabit Ethernet module slots[2]		

1. Port numbering is from left to right, with port 1 on the far left. The first member of the pair (port 1) is above the second member (port 2). On a 24-port switch, module slot numbers are 25, 26 upper, 27, 28 lower. On a 48-port switch, module slot numbers are 49, 50 upper, 51, 52, lower.
2. For use with the Cisco TwinGig Converter Modules and Cisco X2 transceiver modules.

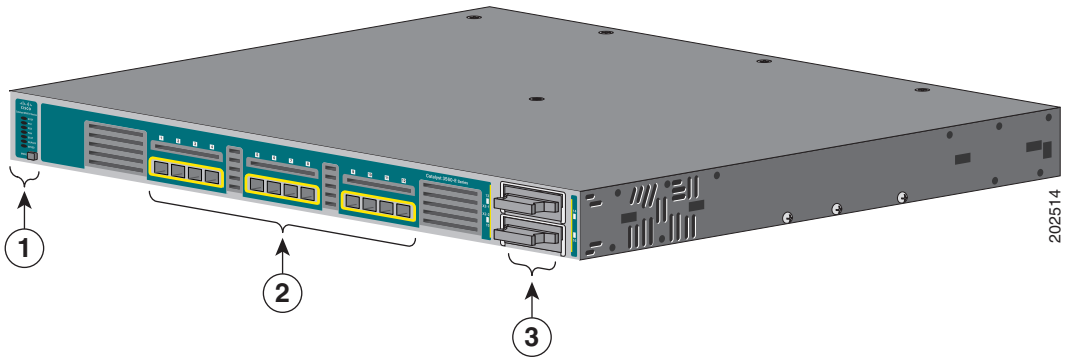
Figure 1-2 Catalyst 3560E-12D Switch Front Panel



1	Mode button and switch LEDs	**2**	10-Gigabit Ethernet module slots[1,2,3]

1. Port numbering is from left to right, with port 1 on the far left.
2. For use with the Cisco TwinGig Converter Modules and Cisco X2 transceiver modules.
3. Use a slotted screwdriver to remove the X2-slot EMC plugs.

Figure 1-3 Catalyst 3560E-12SD Switch Front Panel



1	Mode button and switch LEDs	**2**	SFP module slots[1]
3	10-Gigabit Ethernet module slots[2]		

1. Slot numbering is from left to right, with slot 1 on the far left.
2. For use with the Cisco TwinGig Converter Modules and Cisco X2 transceiver modules.

10/100/1000 Ethernet Ports

The 10/100/1000 Ethernet ports use standard RJ-45 connectors with Ethernet pinouts. The maximum cable length is 328 feet (100 meters). The 100BASE-TX and 1000BASE-T traffic requires Category 5, Category 5e, or Category 6 unshielded twisted pair (UTP) cable. The 10BASE-T traffic can use Category 3 or Category 4 UTP cable.

For more information about the 10/100/1000 Ethernet port connections and specifications, see the "10/100/1000 Ethernet Port Connections" section on page 2-26 and Appendix B, "Connector and Cable Specifications."

PoE Ports

The 10/100/1000 PoE ports provide PoE support for devices compliant with IEEE 802.3af and also provide Cisco pre-standard PoE support for Cisco IP Phones and Cisco Aironet Access Points.

Each port can deliver up to 15.4 W of PoE. With the 1150-W power-supply module, the Catalyst 3750E-48PS and Catalyst 3560E-48PS switches can deliver 15.4 W on all 48 ports. With the 750-W power-supply module, the switches can deliver 15.4 W of PoE on any 24 of the 48 ports, or any combination of the ports can deliver an average of 7.7 W of PoE at the same time, up to a maximum switch power output of 370 W. On a per-port basis, you can control whether or not a PoE port automatically provides power when an IP phone or an access point is connected.

Cisco intelligent power management capabilities include enhanced power negotiation, power reservation, and per-port power policing. For information about configuring and monitoring PoE ports, see the switch software configuration guide on Cisco.com at this location:

http://www.cisco.com/en/US/products/ps7077/products_installation_and_configuration_guides_list.html

For more information about the required power-supply module, PoE port connections, and PoE specifications, see the "Power-Supply Modules" section on page 1-15, the "PoE Port Connections" section on page 2-26, and Appendix B, "Connector and Cable Specifications."

10-Gigabit Ethernet Module Slots

The switch 10-Gigabit Ethernet module slots are used for uplink connection to other switches and routers. The module slots operate in full duplex mode and use the hot-swappable Cisco X2 transceiver modules and the Cisco TwinGig Converter Module. For the supported X2 transceiver modules, see the switch release notes on Cisco.com at this location:

http://www.cisco.com/en/US/products/ps7077/prod_release_notes_list.html

For more information about the 10-Gigabit Ethernet module slots see the "Installing Devices in the 10-Gigabit Ethernet Slots" section on page 2-19. For cable specifications, see Appendix B, "Connector and Cable Specifications."

Cisco TwinGig Converter Module

The Cisco TwinGig Converter Module (model CVR-X2-SFP), also known as the *converter module*, has two SFP module slots that convert a 10-Gigabit slot into a dual SFP module interface to establish Gigabit uplinks to network devices.

For more information about the Cisco TwinGig Converter Module, see the "Installing X2 Transceiver Modules and Converter Modules" section on page 2-19 and the "Installing SFP Modules" section on page 2-22. For cable specifications, see Appendix B, "Connector and Cable Specifications."

SFP Modules

The switch Gigabit Ethernet SFP modules are used for connections to other devices. These transceiver modules are field-replaceable, providing the uplink interfaces when inserted in an SFP module slot. You can use any combination of SFP modules. The SFP modules have LC connectors for fiber-optic connections or RJ-45 connectors for copper connections.

These are the supported Cisco SFP modules:

- 1000BASE-LX/LH
- 1000BASE-SX
- 1000BASE-ZX
- 1000BASE-BX10-D
- 1000BASE-BX10-U
- 1000BASE-T
- 100BASE-FX
- CWDM

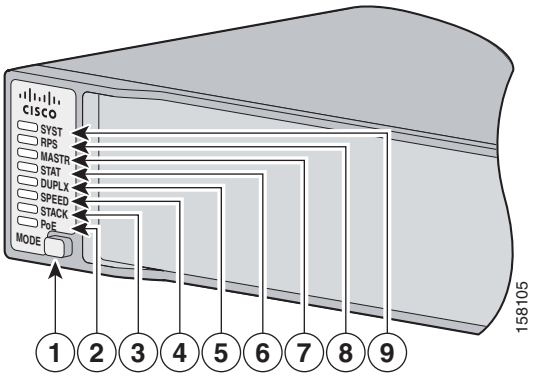
The Catalyst 3560-E switch supports the SFP module patch cable, a 0.5-meter, copper, passive cable with SFP module connectors at each end. The patch cable can connect two Catalyst 3560-E switches in a cascaded configuration.

For more information about SFP modules, see your SFP module documentation and the "Installing SFP Modules" section on page 2-22. For cable specifications, see Appendix B, "Connector and Cable Specifications."

LEDs

You can use the switch LEDs to monitor switch activity and its performance. Figure 1-4 and Figure 1-5 show the switch LEDs and the Mode button that you use to select one of the port modes.

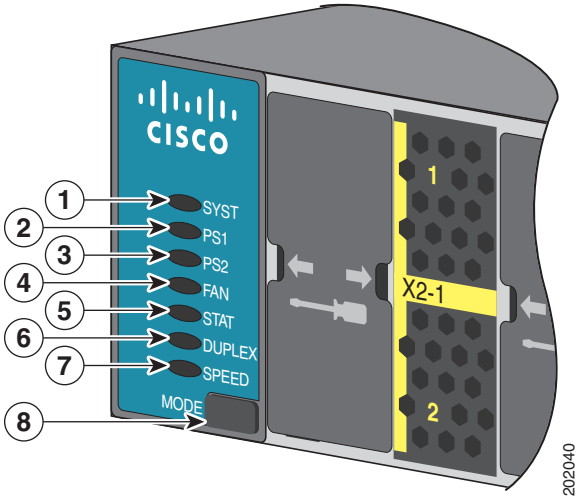
Figure 1-4 24- and 48-Port Switch LEDs



1	Mode button	**6**	Status LED
2	PoE LED[1]	**7**	Master LED[2]
3	Stack LED[2]	**8**	RPS 2300[3] LED
4	Speed LED	**9**	System LED
5	Duplex LED		

1. Only switches with PoE ports.
2. Only Catalyst 3750-E switches.
3. RPS = redundant power system (only 24- and 48-port switches).

Figure 1-5 Catalyst 3560E-12D and 3560E-12SD Switch LEDs (Catalyst 3560E-12D Switch Shown)



1	System LED	**5**	Status LED
2	Power supply 1 LED	**6**	Duplex LED
3	Power supply 2 LED	**7**	Speed LED
4	Fan LED	**8**	Mode button

System LED

The System LED shows whether the system is receiving power and is functioning properly. Table 1-3 lists the LED colors and their meanings.

Table 1-3 System LED

Color	System Status
Off	System is not powered on.
Green	System is operating normally.
Amber	System is receiving power but is not functioning properly.

For information on the System LED colors during power-on self-test (POST), see the "Diagnosing Problems" section on page 4-1.

RPS LED

The RPS LED shows the RPS 2300 status. Table 1-4 lists the LED colors and their meanings. (Only 24- and 48-port switches.)

Table 1-4 RPS LED

Color	RPS Status
Off	RPS is off or not properly connected.
Green	RPS is connected and ready to provide back-up power.
Blinking green	RPS is connected but is unavailable because it is providing power to another device (redundancy has been allocated to a neighboring device).
Amber	The RPS is in standby mode or in a fault condition. See the RPS 2300 documentation for more information about the standby mode and fault conditions.
Blinking amber	The power supply in a switch has failed, and the RPS is providing power to that switch (redundancy has been allocated to this device).

For more information about the RPS 2300, see the *Cisco RPS 2300 Redundant Power System Hardware Installation Guide* on Cisco.com at this location:

http://www.cisco.com/en/US/docs/switches/power_supplies/rps2300/hardware/installation/guide/2300hig.html

Master LED

The Master LED shows the stack master status. Table 1-5 lists the LED colors and their meanings. (Only Catalyst 3750-E switches.)

Table 1-5 Master LED

Color	Description
Off	Switch is not the stack master.
Green	Switch is the stack master or a standalone switch.
Amber	An error occurred when the switch was selecting the stack master switch or another type of stack error occurred.

Power Supply LEDs

The Power Supply LEDs (PS1 and PS2) show the power supply status. Table 1-6 lists the LED colors and their meanings. (Only Catalyst 3560E-12D and 3560E-12SD switches.)

Table 1-6 Power Supply LEDs

Color	Description
Off	No input power.
Green	Input power present.
Amber	Fault detected, or the on/off switch is set to off when the power supply is plugged in.

Fan LED

The Fan LED shows the fan status. Table 1-7 lists the LED colors and their meanings. (Only Catalyst 3560E-12D and 3560E-12SD switches.)

Table 1-7 Fan LED

Color	Description
Off	No input power.
Green	Fan is operating normally.
Amber	Fan fault detected in a chassis cooling fan or a power-supply module fan, or a fan is removed.

Port LEDs and Modes

Each Ethernet port and 10-Gigabit Ethernet module slot has a port LED. These port LEDs, as a group or individually, display information about the switch and about the individual ports. The port mode determines the type of information displayed through the port LEDs. Table 1-8 lists the mode LEDs and their associated port modes and meanings.

To select or change a mode, press the Mode button until the desired mode is highlighted. When you change port modes, the meanings of the port LED colors also change. Table 1-9 explains how to interpret the port LED colors in different port modes.

On a Catalyst 3750-E switch stack, when you press the Mode button on any switch in the stack, all the switches in the stack change to display the same selected mode. For example, if you press the mode button on the stack master to display SPEED, all the other switches in the stack also display SPEED.

Table 1-8 Port Mode LEDs

Mode LED	Port Mode	Description
STAT	Port status	The port status. This is the default mode.
DUPLX	Port duplex mode	The port duplex mode: full duplex or half duplex. **Note** The 10/100/1000 ports operate only in full-duplex mode.
SPEED	Port speed	The port operating speed: 10, 100, or 1000 Mb/s.
STACK[1]	Stack member status StackWise port status	The stack member status. The StackWise port status. See the "Stack LED" section on page 1-12 for more information.
PoE[2]	PoE port power	The PoE port status.

1. Only Catalyst 3750-E switches.
2. Only switches with PoE ports.

Table 1-9 lists the LED colors in different modes and their meanings.

Table 1-9 Meaning of Switch LED Colors in Different Modes

Port Mode	Port LED Color	Meaning
STAT (port status)	Off	No link, or port was administratively shut down.
	Green	Link present.
	Blinking green	Activity. Port is sending or receiving data.
	Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collisions, CRC errors, and alignment and jabber errors are monitored for a link-fault indication.
	Amber	Port is blocked by Spanning Tree Protocol (STP) and is not forwarding data. After a port is reconfigured, the port LED can remain amber for up to 30 seconds as STP checks the switch for possible loops.
	Blinking amber	Port is blocked by STP and is sending or receiving packets.
DUPLX (duplex)	Off	Port is operating in half duplex.
	Green	Port is operating in full duplex.
SPEED	**10/100/1000 ports**	
	Off	Port is operating at 10 Mb/s.
	Green	Port is operating at 100 Mb/s.
	Blinking green	Port is operating at 1000 Mb/s.
	10-Gigabit Ethernet module slots	
	Off	Port is not operating.
	Blinking green	Port is operating at up to 10 Gbps.
STACK[1] (stack member)	Off	No stack member corresponding to that member number.
	Blinking green	Stack member number.
	Green	Member numbers of other stack member switches.

Table 1-9 Meaning of Switch LED Colors in Different Modes (continued)

Port Mode	Port LED Color	Meaning
PoE[2]	Off	PoE is off. If the device is receiving power from an AC power source, the port LED is off even if the device is connected to the switch port.
	Green	PoE is on. The port LED is green only when the switch port is providing power.
	Alternating green and amber	PoE is denied because providing power to the powered device will exceed the switch power capacity.
	Blinking amber	PoE is off due to a fault or because it has exceeded a limit set in the switch software. ⚠ **Caution** PoE faults are caused when noncompliant cabling or powered devices are connected to a PoE port. You can use only standard-compliant cabling to connect Cisco pre-standard IP Phones and wireless access points or IEEE 802.3af-compliant devices to PoE ports. You must remove from the network any cable or device that causes a PoE fault.
	Amber	PoE for the port has been disabled. **Note** PoE is enabled by default.

1. Only Catalyst 3750-E switches.
2. Only switches with PoE ports.

PoE LED

If the PoE LED mode is not selected on a switch with PoE ports, the PoE LED still shows detected PoE problems. Table 1-10 lists the PoE LED colors and their meanings.

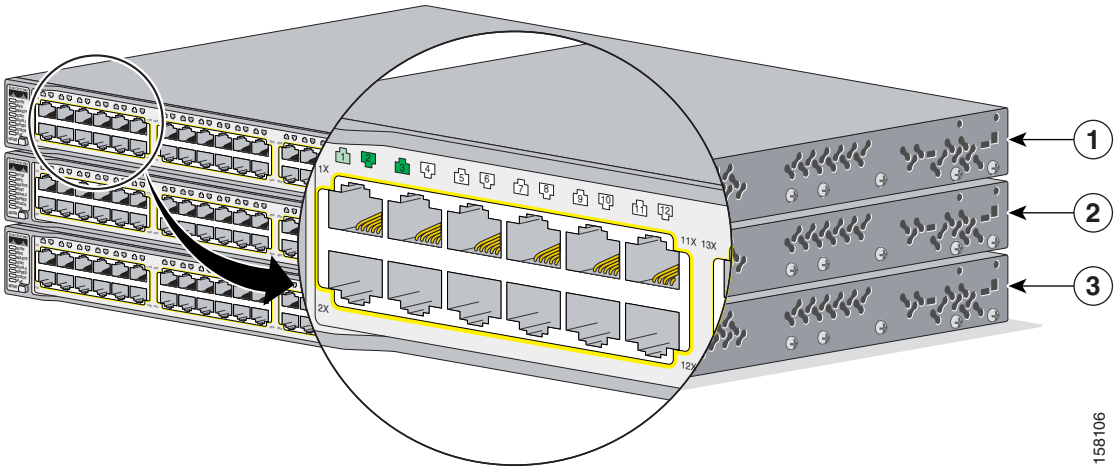
Table 1-10 PoE Mode LED

Color	PoE Status
Off	PoE mode is not selected. None of the 10/100/1000 ports have been denied power or are in a fault condition.
Green	PoE mode is selected, and the port LEDs show the PoE status.
Blinking amber	PoE mode is not selected. At least one of the 10/100/1000 ports has been denied power, or at least one of the 10/100/1000 ports has a PoE fault.

Stack LED

On Catalyst 3750-E switches, the stack LED shows the sequence of member switches in a stack. Up to nine switches can be members of a stack. The first nine port LEDs show the member number of a switch in a stack. Figure 1-6 shows the LEDs on the first switch, which is stack member number 1. For example, if you press the Mode button and select Stack, the LED for port 1 blinks green. The LEDs for ports 2 and 3 are solid green, as these represent the member numbers of other switches in the stack. The other port LEDs are off because there are no more members in the stack.

Figure 1-6 Stack LED



1	Stack member 1	**3**	Stack member 3
2	Stack member 2		

When you select the Stack LED mode, the representative Stack LEDs are green when the StackWise ports (on the switch rear panel) are up, and the representative Stack LEDs are amber when the ports are down. The 10-Gigabit Ethernet module slot LEDs 1 and 2 show the status for StackWise ports 1 and 2, respectively.

In Stack LED mode when all 10-Gigabit Ethernet uplink port LEDs are green, the stack is operating at full bandwidth. If any of the10-Gigabit uplink LEDs are not green, the stack is not operating at full bandwidth.

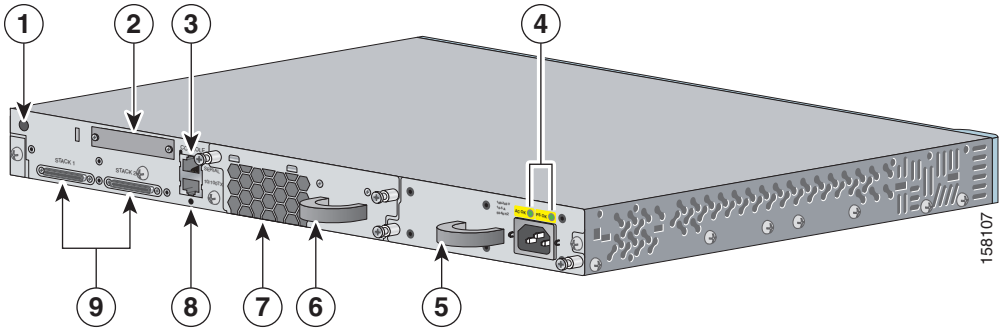
Rear Panel Description

The 24- and 48-port switch rear panels have a ground location, an RPS 2300 connector, an RJ-45 console port, a power-supply module, a fan module, an RJ-45 10/100 management port, and two StackWise connectors (only Catalyst 3750-E switches), as shown in Figure 1-7, and described on the following pages. Figure 1-7 shows the Catalyst 3750E-48 PoE switch as an example. All the 24- and 48-port switches have similar components.

The Catalyst 3560E-12D switch rear panel has two power-supply modules, four fan modules, an RJ-45 console port, an RJ-45 10/100 management port, and a ground location, as shown in Figure 1-8, and described on the following pages.

The Catalyst 3560E-12SD switch rear panel has two power-supply modules, two fan modules, an RJ-45 console port, an RJ-45 10/100 management port, and a ground location, as shown in Figure 1-9, and described on the following pages.

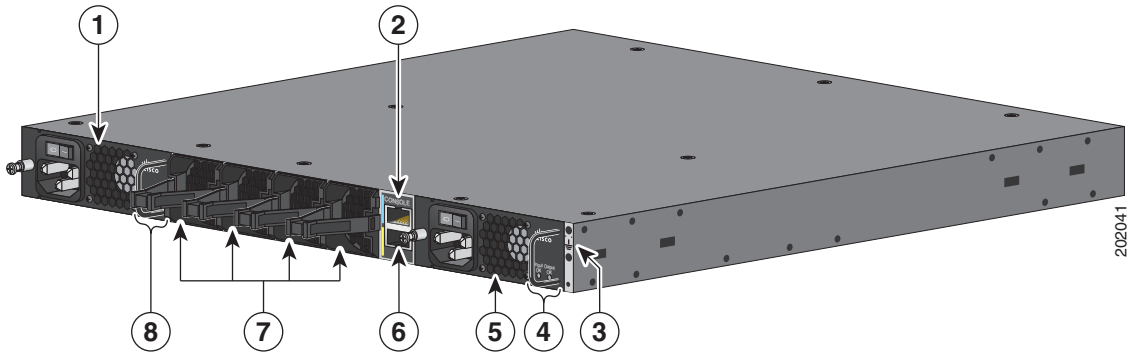
Figure 1-7 24- and 48-Port Switch Rear Panel



1	Ground location	**6**	Fan module
2	RPS 2300 connector (shown with cover)	**7**	Fan exhaust
3	Console port	**8**	Ethernet management port and LED
4	Power-supply LEDs	**9**	StackWise ports[1]
5	Power-supply module		

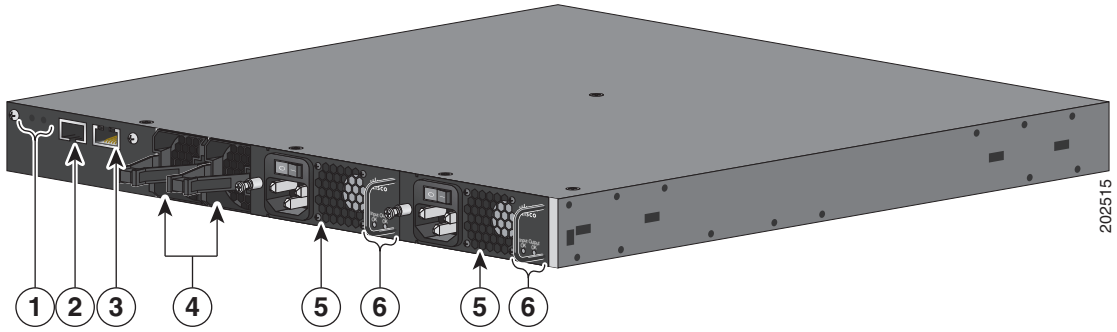
1. Only Catalyst 3750-E switches.

Figure 1-8 Catalyst 3560E-12D Switch Rear Panel



1	Power-supply module and fan exhaust	**5**	Power-supply module and fan exhaust
2	Console port	**6**	Ethernet management port and LED
3	Ground location	**7**	Fan modules and fan exhaust
4	Power-supply-module LEDs	**8**	Power-supply-module LEDs

Figure 1-9 Catalyst 3560E-12SD Switch Rear Panel



1	Ground location	**4**	Fan modules and fan exhaust
2	Console port	**5**	Power-supply module and fan exhaust
3	Ethernet management port and LED	**6**	Power-supply-module LEDs

StackWise Ports

The Catalyst 3750-E switch ships with a 0.5-meter StackWise cable (72-2632-XX CABASY) that you can use to connect the StackWise ports.

Caution Use only approved cables (CAB-STACK-50CM, CAB-STACK-1M, or CAB-STACK-3M), and connect only to similar Cisco equipment. Equipment might be damaged if connected to nonapproved Cisco cables or equipment.

You can order these StackWise cables from your Cisco sales representative:

- CAB-STACK-50CM= (0.5-meter cable)
- CAB-STACK-1M= (1-meter cable)
- CAB-STACK-3M= (3-meter cable)

Power-Supply Modules

The 24- and 48-port switches are powered through an internal power-supply module. The "24- and 48-Port Switch Power-Supply Modules" section on page 1-15 and Table 1-11 describe the supported power-supply modules for the switches.

The Catalyst 3560E-12D and 3560E-12SD switches are powered through two internal power-supply modules. The "Catalyst 3560E-12D and 3560E-12SD Switch Power-Supply Modules" section on page 1-16 and Table 1-13 describe the supported power-supply modules for the switch.

24- and 48-Port Switch Power-Supply Modules

The 24- and 48-port switches have one internal 265-W, 750-W, or 1150-W power-supply module (Table 1-11). The 265-W and 750-W AC-power-supply modules are autoranging units that support input voltages between 100 and 240 VAC. The 1150-W power-supply module is an autoranging unit that supports input voltages between 115 and 240 VAC. The DC-power-supply module has dual input feeds (A and B) and supports input voltages between 36 and 72 VDC.

The AC-power-supply modules have a power cord for connection to an AC power outlet. The 1150-W and 750-W modules use a 16-AWG cord (only North America). All other modules use an 18-AWG cord. The DC-power-supply module requires wiring to a DC-power source.

For switches connected to an RPS 2300, the RPS 2300 powers the switch when the power-supply is removed or fails. When a new switch power supply is inserted, the switch software polls the device. The switch power supply then automatically resumes providing power, and the RPS 2300 is available to power other devices.

Table 1-11 24- and 48-Port Switch Power-Supply Modules

Power-Supply Module	48-Port PoE Switch[1]	24-Port PoE Switch	48-Port non-PoE Switch	24-Port Non-PoE Switch
C3K-PWR-1150WAC=	Primary or spare	Spare	Spare	Spare
C3K-PWR-750WAC=	Spare or primary	Primary or spare	Spare	Spare
C3K-PWR-265WAC=	Not allowed	Not allowed	Primary or spare	Primary or spare
C3K-PWR-265WDC=	Not allowed	Not allowed	Primary or spare	Primary or spare

1. For full 15.4-W support on a 48-port PoE switch, you must use the C3K-PWR-1150WAC-power-supply module.

The power-supply modules have two status LEDs. Table 1-12 lists the LED colors and their meanings.

Table 1-12 24- and 48-Port Switch Power-Supply Module LEDs

AC-Power-Supply Module LEDs			
AC OK	**Description**	**PS OK**	**Description**
Off	No AC input power.	Off	Power supply failure.
Green	AC input power present.	Green	Power output to switch active.
		Red	No output power to switch.
DC-Power-Supply Module LEDs			
DC IN	**Description**	**PS OK**	**Description**
Off	No DC input power.	Off	Power supply failure.
Green	DC input power present.	Green	Power output to switch active.

For more information about replacing a power-supply module, wiring a DC-power-supply module, and for module specifications, see Chapter 3, "Power Supply and Fan Module Installation," and Appendix A, "Technical Specifications."

Catalyst 3560E-12D and 3560E-12SD Switch Power-Supply Modules

The Catalyst 3560E-12D and 3560E-12SD switches have two internal 300-W power-supply modules (Table 1-13). The AC-power-supply modules are autoranging units that support input voltages between 85 and 265 VAC. The DC-power-supply modules have a single input feed and support input voltages between –40.5 and –72 VDC. You can use two AC modules, two DC modules, or a mixed configuration of one AC and one DC power-supply module.

The Catalyst 3560E-12D and 3560E-12SD switches can operate with only one active power-supply module. However, two power supply modules must always be physically installed in the switch rear panel when the switch is operating, even if one module is defective. This is required to maintain adequate airflow in the chassis and prevent overheating.

Caution Do not operate a Catalyst 3560E-12D or 3560E-12SD switch with one power-supply module removed from the rear panel. For proper chassis cooling, two power-supply modules must be installed in the switch rear panel.

The AC power-supply modules have a power cord for connection to an AC-power outlet. The DC power-supply modules require wiring to a DC-power source. The AC-power supplies have an on/off power switch. DC-power supplies do not have an on/off switch.

Table 1-13 Catalyst 3560E-12D and 3560E-12SD Switch Power-Supply Modules

Switch	**AC-Power-Supply Module**	**DC-Power-Supply Module**
Catalyst 3560E-12D	C3K-PWR-300WAC=	C3K-PWR-300WDC=
Catalyst 3560E-12SD	C3K-PWR-300WAC=	C3K-PWR-300WDC=

The power-supply modules have two status LEDs. Table 1-14 lists the LED colors and their meanings.

Table 1-14 Catalyst 3560E-12D and 3560E-12SD Switch Power-Supply Module LEDs

AC-Power-Supply Module LEDs[1]			
AC OK	**Description**	**PS OK**	**Description**
Off	No AC input power to either power supply, or both power supplies are turned off.	Off	No AC input power to either power supply, or both power supplies are turned off.
Green	AC input power present.	Green	Power output to switch is active with no fault conditions.
Red	No AC input power or power supply is turned off.	Red	AC OK LED is red, no output power to the switch, or the power supply or power supply fan has failed.
DC-Power-Supply Module LEDs[1]			
DC IN	**Description**	**PS OK**	**Description**
Off	No DC input power to either power supply.	Off	No DC input power to either power supply.
Green	DC input power present.	Green	Power output to switch is active with no fault conditions.
Red	No DC input power.	Red	DC IN LED is red, no output power to the switch, or the power supply or power supply fan has failed.

1. If one power-supply module is installed but not turned on, the module LEDs continue to operate because of the shared voltage between the power-supply modules. If the only operating power-supply module fails or is turned off, the LEDs for neither module are on.

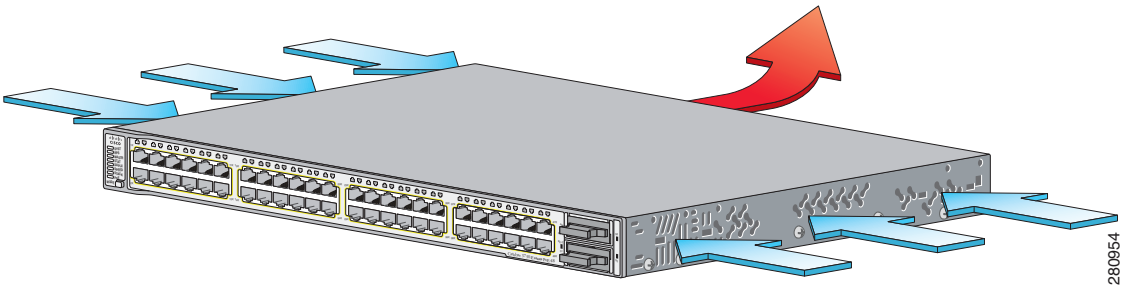
For more information about replacing a power-supply module, wiring a DC power-supply module, and for module specifications, see Chapter 3, "Power Supply and Fan Module Installation," and Appendix A, "Technical Specifications."

Fan Modules

The 24- and 48-port switch models have one internal hot-swappable 12-V fan module that inserts in the switch rear panel (part number C3K-BLWR-60CFM=). The air circulation system consists of the fan module and the power supply modules. The airflow patterns vary depending on the power supply configuration.

Figure 1-10 shows the airflow patterns for the 24- and 48-port switches. The blue arrow shows cool air flow, and the red arrow shows warm air flow.

Figure 1-10 24- and 48-Port Switch Airflow Patterns



The Catalyst 3560E-12D switch has four internal hot-swappable 12-V fan modules that insert in the switch rear panel. The Catalyst 3560E-12SD switch has two internal hot-swappable 12-V fan modules that insert in the switch rear panel. The air circulation system consists of the fan module and the power supply modules.

Each fan module (part number C3K-FAN-16CFM=) has a green LED that shows that it is operating. The LED is off when there is a fan failure. The Catalyst 3560E-12D or 3560E-12SD switch continues to operate when there is one failed fan, either a power-supply fan or a chassis cooling fan. If one fan fails, the switch returns an error message. If a second fan fails, either a power supply fan or a chassis cooling fan, the switch returns an error message, writes a failure log to flash memory, and shuts down.

Figure 1-11 shows the airflow patterns for the Catalyst 3560E-12D switch. The blue arrow shows cool air flow, and the red arrow shows warm air flow.

Figure 1-11 Catalyst 3560E-12D Switch Airflow Patterns

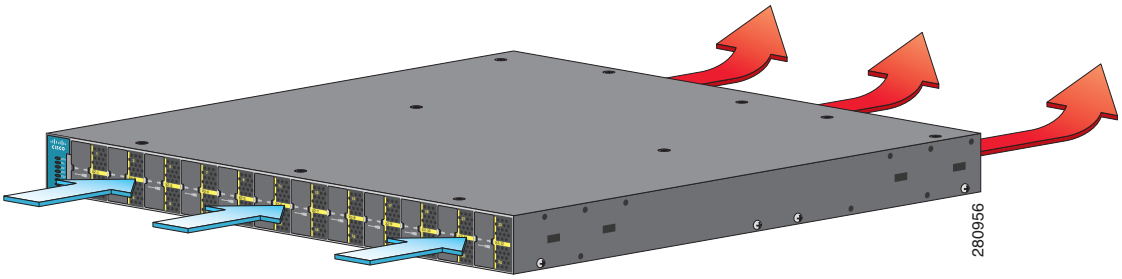
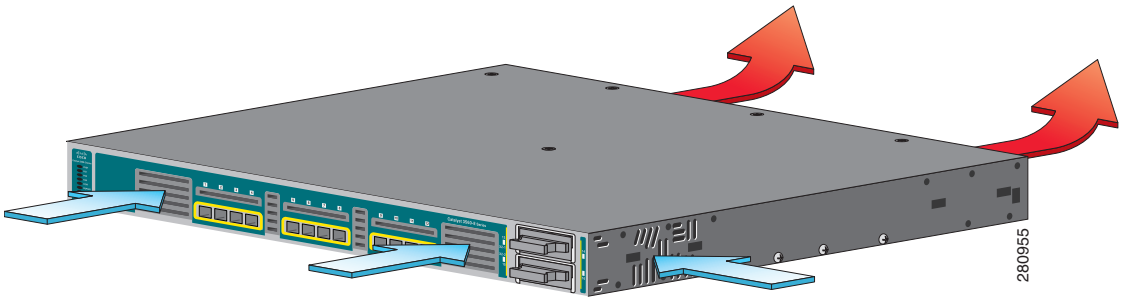


Figure 1-12 shows the airflow patterns for the for the Catalyst 3560E-12SD switch. The blue arrow shows cool air flow, and the red arrow shows warm air flow.

Figure 1-12 Catalyst 3560E-12SD Switch Airflow Patterns



For more information about installing a fan module and the module specifications, see Chapter 3, "Power Supply and Fan Module Installation," and Appendix A, "Technical Specifications."

RPS Connector

The 24- and 48-port switches are supported by the Cisco RPS 2300 (model PWR-RPS2300=). The Catalyst 3560E-12D and 3560E-12SD switches have two power supplies and are not supported by the RPS-2300.

Warning **Attach only the following Cisco RPS model to the RPS receptacle: RPS 2300.** Statement 370

The RPS 2300 is a redundant power system that can support six network switches and provide power to one or two failed switches at a time. It automatically senses when the power supply of a connected switch fails and provides power to the failed switch, preventing loss of network traffic.

The Cisco RPS 2300 has two output levels: –52 V and 12 V. The total maximum output power depends on the installed power-supply modules.

The six ports on the RPS 2300 provide the power and management communication signals to the Catalyst 3750-E and 3560-E switches (other switch models do not support this management communication). The RPS 2300 communicates with each switch through the 22-pin cable. All connected switches can communicate with the RPS 2300 simultaneously. You can configure these RPS 2300 features through the switch software:

- Enable RPS active or standby mode for each connected switch
- Configure switch priority for RPS support
- List the connected switches and their power-supply module size
- Report when a switch is powered by the RPS
- Report the RPS power-supply module status
- Read and monitor backup, failure, and exception history

For more information about the RPS 2300, including device support other than for the Catalyst 3750-E and 3560-E switches, see the *Cisco Redundant Power System 2300 Hardware Installation Guide* on Cisco.com at this location:

http://www.cisco.com/en/US/docs/switches/power_supplies/rps2300/hardware/installation/guide/2300hig.html

Also see the switch software configuration guide on Cisco.com at this location:

http://www.cisco.com/en/US/products/ps7077/products_installation_and_configuration_guides_list.html

Management Ports

You can connect the switch to a host such as a Windows workstation or a terminal server through the 10/100 Ethernet management port or the console port (shown in Figure 1-7 and Figure 1-8). The 10/100 Ethernet management port connection uses a standard RJ-45 crossover or straight-through cable. The console port connection uses the supplied RJ-45-to-DB-9 female cable.

Table 1-15 lists the Ethernet management port LED colors and their meanings.

Table 1-15 Ethernet Management Port LED

Color	Description
Green	Active link to PC
Off	Inactive link
Amber	POST failure

For more information about the switch management ports, see the switch software configuration guide and the command reference on Cisco.com and the "Connector and Cable Specifications" section on page B-1.

Management Options

The Catalyst 3750-E and 3560-E switches offer several management options:

- Cisco Network Assistant

  Cisco Network Assistant is a PC-based network management GUI application optimized for LANs of small and medium-sized businesses. Cisco Network Assistant offers centralized management of Cisco switches ranging from the Catalyst Express 500 through the Cisco Catalyst 4506. Through a GUI, users can configure and manage switch clusters or standalone switches. Cisco Network Assistant is available at no cost and can be downloaded from this URL:

  http://www.cisco.com/en/US/products/ps5931/tsd_products_support_series_home.html

  For information on starting the Network Assistant application, see the *Getting Started with Cisco Network Assistant* guide on Cisco.com.

- Device manager

  You can use the device manager, which is in the switch memory, to manage individual and standalone switches. This web interface offers quick configuration and monitoring. You can access the device manager from anywhere in your network through a web browser. For more information, see the getting started guide and the device manager online help.

- Cisco IOS CLI

  The switch CLI is based on Cisco IOS software and is enhanced to support desktop-switching features. You can fully configure and monitor the switch and switch cluster members from the CLI. You can access the CLI either by connecting your management station directly to the switch management port or a console port or by using Telnet from a remote management station. See the switch command reference on Cisco.com for more information.

- CiscoWorks application

  The CiscoWorks LAN Management Solution (LMS) is a suite of management tools that simplify the configuration, administration, monitoring, and troubleshooting of Cisco networks. See the LMS documentation for more information.

- SNMP network management

  You can manage switches from a Simple Network Management Protocol (SNMP)-compatible management station that is running platforms such as HP OpenView or SunNet Manager. The switch supports a comprehensive set of Management Information Base (MIB) extensions and four Remote Monitoring (RMON) groups. See the switch software configuration guide on Cisco.com and the documentation that came with your SNMP application for more information.

Network Configurations

See the switch software configuration guide on Cisco.com for network configuration concepts and examples of using the switch to create dedicated network segments and interconnecting the segments through Gigabit Ethernet connections.

CHAPTER 2

Switch Installation

This chapter describes how to install a Catalyst 3750-E or a Catalyst 3560-E switch and make connections to the switch. It also includes planning and cabling considerations for stacking switches (only Catalyst 3750-E switches). Read the topics and perform the procedures in this order:

- Preparing for Installation, page 2-1
- Planning a Switch Stack (Catalyst 3750-E Switches), page 2-6
- Installing the Switch, page 2-10
- Connecting to the StackWise Ports (Catalyst 3750-E Switches), page 2-18
- Installing Devices in the 10-Gigabit Ethernet Slots, page 2-19
- Installing SFP Modules, page 2-22
- Connecting Devices to the Ethernet Ports, page 2-25
- Where to Go Next, page 2-28

For initial switch setup, how to assign the switch IP address, and for powering information, see the switch getting started guide on Cisco.com.

Preparing for Installation

This section covers these topics:

- Safety Warnings, page 2-1
- Installation Guidelines, page 2-5
- Box Contents, page 2-6
- Tools and Equipment, page 2-6

Safety Warnings

This section includes the basic installation caution and warning statements. Translations of the warning statements appear in the *Regulatory Compliance and Safety Information for the Catalyst 3750-E and Catalyst 3560-E Switch* document that shipped with the switch and online at Cisco.com. Read this section before you start the installation procedure.

Warning **To prevent the switch from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 113•F (45•C). To prevent airflow restriction, allow at least 3 inches (7.6 cm) of clearance around the ventilation openings.** Statement 17B

Warning **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.** Statement 43

Warning **Do not stack the chassis on any other equipment. If the chassis falls, it can cause severe bodily injury and equipment damage.** Statement 48

Warning **An exposed wire lead from a DC-input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC-input power source wire extends from the terminal block plug.** Statement 122

Warning **Ethernet cables must be shielded when used in a central office environment.** Statement 171

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.** Statement 206

Warning **If a redundant power system (RPS) is not connected to the switch, install an RPS connector cover on the back of the switch.** Statement 265

Warning **Voice over IP (VoIP) service and the emergency calling service do not function if power fails or is disrupted. After power is restored, you might have to reset or reconfigure equipment to regain access to VoIP and the emergency calling service. In the USA, this emergency number is 911. You need to be aware of the emergency number in your country.** Statement 361

Warning **Attach only the following Cisco RPS model to the RPS receptacle: RPS 2300.** Statement 370

Warning **Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.** Statement 378

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

Warning **Read the installation instructions before connecting the system to the power source.** Statement 1004

Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

Warning **Class 1 laser product.** Statement 1008

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

Warning **The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.** Statement 1019

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

Warning **This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

Warning **For connections outside the building where the equipment is installed, the following ports must be connected through an approved network termination unit with integral circuit protection: 10/100/1000 Ethernet.** Statement 1044

Warning **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

Warning **Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security.** Statement 1072

Warning **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

Statement 371—Power Cable and AC Adapter

Caution To comply with the Telcordia GR-1089 Network Equipment Building Systems (NEBS) standard for electromagnetic compatibility and safety, connect the Ethernet cables only to intrabuilding or nonexposed wiring or cabling.

Caution To comply with the Telcordia GR-1089 NEBS standard, PoE or non-PoE 10/100/1000 Ethernet port cables that exit from either the left side or right side of the switch should be routed and tied to the nearest rack metal hardware.

Note The grounding architecture of this product is DC-isolated (DC-I)

Installation Guidelines

Before installing the switch, verify that these guidelines are met:

- Clearance to front and rear panels is such that
  - Front-panel indicators can be easily read.
  - Access to ports is sufficient for unrestricted cabling.
  - AC power cord can reach from the AC power outlet to the connector on the switch rear panel.
  - The X2-10GB-CX4 transceiver module minimum bend radius and connector length is met. See the X2 transceiver module documentation for more information.
- For switches that support the RPS 2300, confirm that you have access to the switch rear panel to connect the RPS 2300. If you do not have access to the rear panel, you should cable the switches before you rack-mount them.
- For switches with the optional 1150-W power-supply module (C3K-PWR-1150WAC=), first rack-mount the switch before installing the power-supply module.
- For power-supply modules and fan modules, tighten the module captive screws before moving the switch.
- When connecting or disconnecting the power cord on a switch that is installed above or below a 1150-W power supply-equipped switch, you might need to remove the module from the switch to access the power cord.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures. Make sure that the cabling is safely away from other devices that might damage the cables.
- For copper connections on Ethernet ports, cable lengths from the switch to connected devices can be up to 328 feet (100 meters).
- For cable requirements for X2 module connections, see the "Cable and Adapter Specifications" section on page B-5. Each port must match the wave-length specifications on the other end of the cable, and the cable must not exceed the required cable length.
- Operating environment is within the ranges listed in Appendix A, "Technical Specifications."
- Airflow around the switch and through the vents is unrestricted.
- Temperature around the unit does not exceed 113°F (45°C). If the switch is installed in a closed or multirack assembly, the temperature around it might be greater than normal room temperature.
- Cisco Ethernet Switches are equipped with cooling mechanisms, such as fans and blowers. However, these fans and blowers can draw dust and other particles, causing contaminant buildup inside the chassis, which can result in system malfunction. You must install this equipment in an environment as free from dust and foreign conductive material (such as metal flakes from construction activities) as is possible.

  These standards provide guidelines for acceptable working environments and acceptable levels of suspended particulate matter:
  - Network Equipment Building Systems (NEBS) GR-63-CORE
  - National Electrical Manufacturers Association (NEMA) Type 1
  - International Electrotechnical Commission (IEC) IP-20

Box Contents

The box contents are described in the switch getting started guide. If any item is missing or damaged, contact your Cisco representative or reseller for support.

Tools and Equipment

You need to supply a number-2 Phillips screwdriver to rack-mount the switch. For connecting the StackWise cables, you need a ratcheting torque screwdriver capable of 5 lbf-in. (80 ozf-in.).

Planning a Switch Stack (Catalyst 3750-E Switches)

If you plan to stack your switches, read these sections:

- Switch Stacking Guidelines, page 2-6
- Stack Cabling Configurations, page 2-7
- Stack Bandwidth and Partitioning Examples, page 2-8
- Power On Sequence for Switch Stacks, page 2-9

Switch Stacking Guidelines

For general concepts and procedures to manage switch stacks, see the switch software configuration guide on Cisco.com. When adding a Catalyst 3750-E switch to an existing 3750 switch stack, review the *Catalyst 3750-E Switch Stack Compatibility Guide* on Cisco.com for information about mixed stack configurations.

Before connecting the switches in a stack, keep in mind these stacking guidelines:

- Size of the switch and any optional power-supply module. The 1150-W power-supply module is longer than the other modules. Stacking switches with the same power-supply modules together makes it easier to cable the switches. For switch dimensions, see Appendix A, "Technical Specifications."
- Length of cable. Depending on the configurations that you have, you might need different sized cables. If you do not specify the length of the StackWise cable, the 0.5-meter cable is supplied. If you need the 1-meter cable or the 3-meter cable, you can order it from your Cisco supplier. For cable part numbers, see the "StackWise Ports" section on page 1-14. The "Stack Cabling Configurations" section on page 2-7 provides examples of recommended configurations.
- Access to the switch rear panel and to the rear of the rack if you are planning to stack the switches. If you do not have access to the rear panel, make sure that you cable the switches before you rack-mount them.
- For switch stacks that are rack-mounted, review this recommended sequence of events:
  - If you are using the RPS 2300, install the RPS first at the bottom of the stack. If needed, allow one RU space between the RPS and the first switch above to provide room for cabling.
  - Connect all the 22-pin RPS cables to the RPS 2300 as needed.
  - Rack-mount the switches. If you have the optional 1150-W power-supply module, first rack-mount the switch before installing the power-supply module.

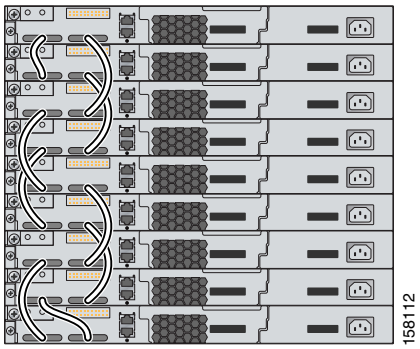
- Connect the RPS cable to the first switch above the RPS 2300. Connect the stack cables to the first switch above the RPS.
- Connect the RPS cable to the next switch above the RPS 2300. Connect the stack cables to the next switch above the RPS.
- Repeat until all devices are connected.

Stack Cabling Configurations

This section describes the recommended cabling configurations for stacking the switches.

Figure 2-1 is an example of a recommended configuration that uses the supplied 0.5-meter StackWise cable. In this example, the switches are stacked in a vertical rack or on a table. This configuration provides redundant connections.

Figure 2-1 Stacking the Switches in a Vertical Rack or on a Table Using the 0.5-meter StackWise Cable



The configuration examples in Figure 2-2 use the 3-meter StackWise cable in addition to the supplied 0.5-meter StackWise cable. This configuration also provides redundant connections.

Figure 2-2 Stacking the Catalyst 3750-E Switches in a Vertical Rack or on a Table Using 0.5-meter and 3-meter StackWise Cables

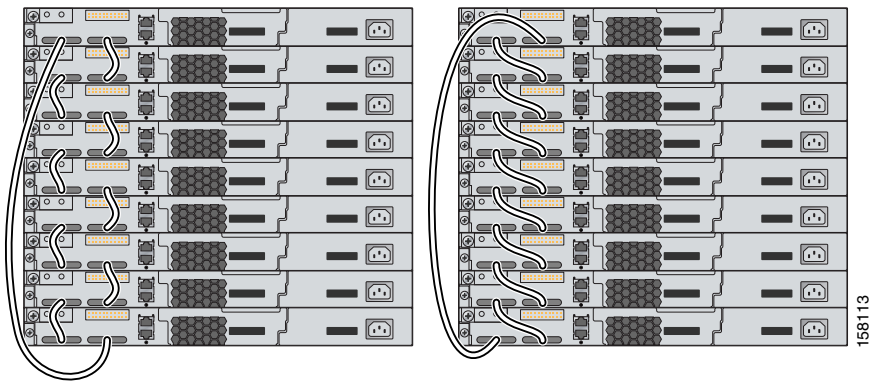


Figure 2-3 and Figure 2-4 are examples of recommended configurations when the switches are rack- or wall-mounted side-by-side. Use the 1-meter and the 3-meter StackWise cables to connect the switches. These configuration provide redundant connections.

Figure 2-3 Stacking up to Eight Switches in a Side-by-Side Mounting Configuration

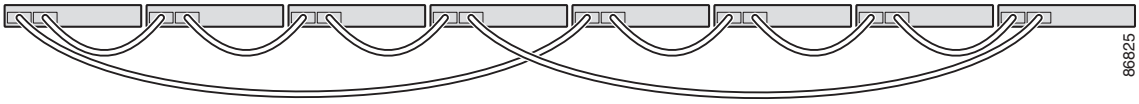
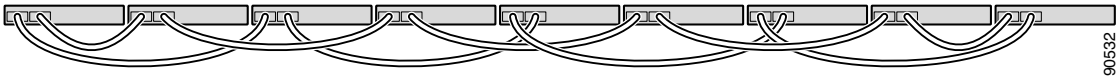


Figure 2-4 Stacking Nine Switches in a Side-by-Side Mounting Configuration



Stack Bandwidth and Partitioning Examples

This section provides examples of stack bandwidth and possible stack partitioning.

Figure 2-5 shows an example of a stack of Catalyst 3750-E switches that provides full bandwidth and redundant StackWise cable connections.

Figure 2-5 Example of a Stack with Full Bandwidth Connections

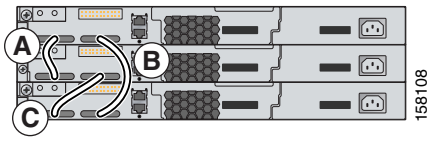


Figure 2-6 shows an example of a stack of Catalyst 3750-E switches with incomplete StackWise cabling connections. This stack provides only half bandwidth and does not have redundant connections.

Figure 2-6 Example of a Stack with Half Bandwidth Connections

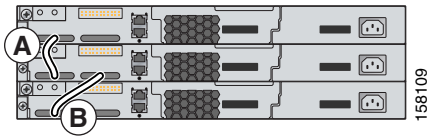


Figure 2-7 and Figure 2-8 show examples of stacks of Catalyst 3750-E switches with failover conditions. In Figure 2-7, the StackWise cable is bad in link B; therefore, this stack provides only half bandwidth and does not have redundant connections. In Figure 2-8, link B is bad; therefore, this stack partitions into two stacks, and switch 1 and switch 3 are stack masters.

Figure 2-7 Example of a Stack with a Failover Condition

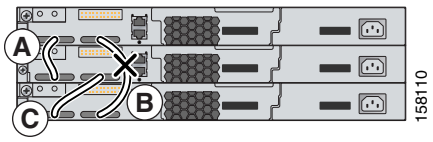
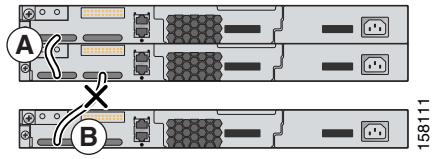


Figure 2-8 Example of a Partitioned Stack with a Failover Condition



Power On Sequence for Switch Stacks

Consider these guidelines before you power on the switches in a stack:

- The sequence in which the switches are first powered on might affect the switch that becomes the stack master.
- If you want a particular switch to become the stack master, power on that switch first. This switch becomes the stack master and remains the stack master until a master re-election is required. After 1 minute, power on the other switches in the stack.
- If you have no preference as to which switch becomes the stack master, power on all the switches in the stack within a 1-minute timeframe. These switches participate in the stack master election. Switches powered on after the 1-minute timeframe do not participate in the election.
- Power off a switch before you add it to or remove it from an existing switch stack.

For conditions that can cause a stack master re-election or to manually elect the stack master, see the “Managing Switch Stacks” chapter in the switch software configuration guide on Cisco.com.

Installing the Switch

This section describes these installation procedures:

- Rack-Mounting, page 2-10
- Wall-Mounting, page 2-15
- Table- or Shelf-Mounting, page 2-17
- After Installing the Switch, page 2-17

The illustrations shown in this section show the Catalyst 3750E-48 PoE switch as an example. Except for wall-mounting, you can install the Catalyst 3750-E and Catalyst 3560-E switches following the same procedures.

Rack-Mounting

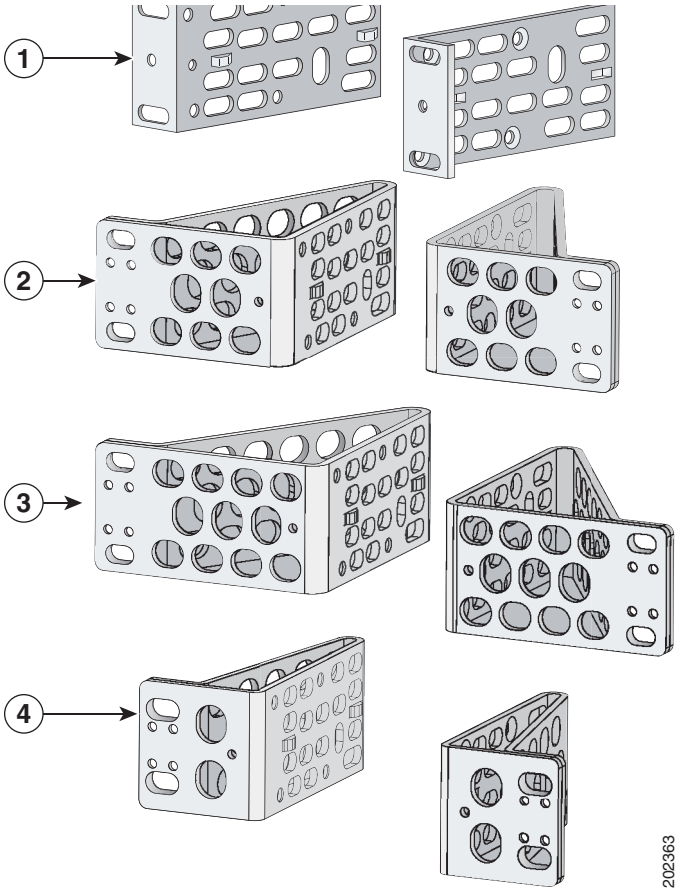
To install the switch in a 19-inch rack, follow the instructions described in this section.

Warning **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**

- **This unit should be mounted at the bottom of the rack if it is the only unit in the rack.**
- **When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.**
- **If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.** Statement 1006

Installing the switch in other rack types requires an optional bracket kit not included with the switch. Figure 2-9 shows the standard 19-inch brackets and optional mounting brackets and part numbers.

Figure 2-9 Rack-Mounting Brackets

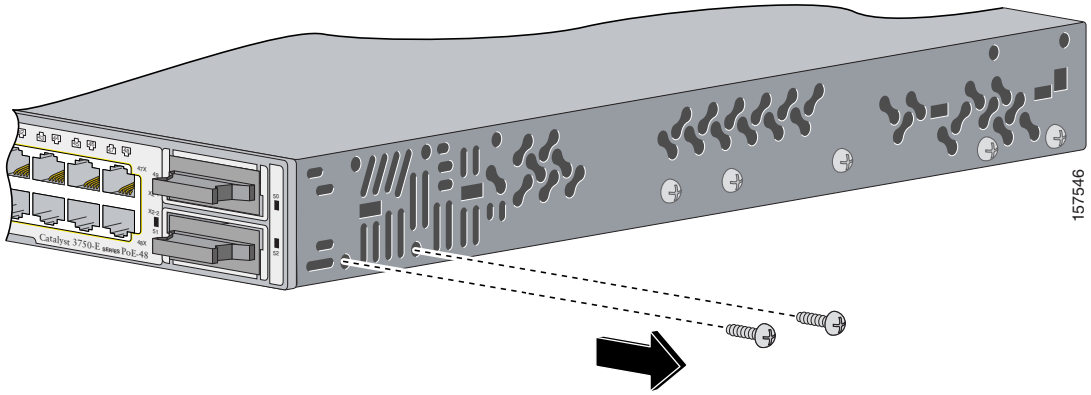


1	19-inch brackets, part number RCKMNT-E-1RU=
2	23-inch brackets, part number RCKMNT-E-MISC=
3	23/24-inch brackets, part number RCKMNT-E-MISC=
4	ETSI brackets, part number RCKMNT-E-MISC=
5	Wall-mount brackets for Catalyst 3560E-12D switches, part number 700-25427-XX=

Attaching the Rack-Mount Brackets

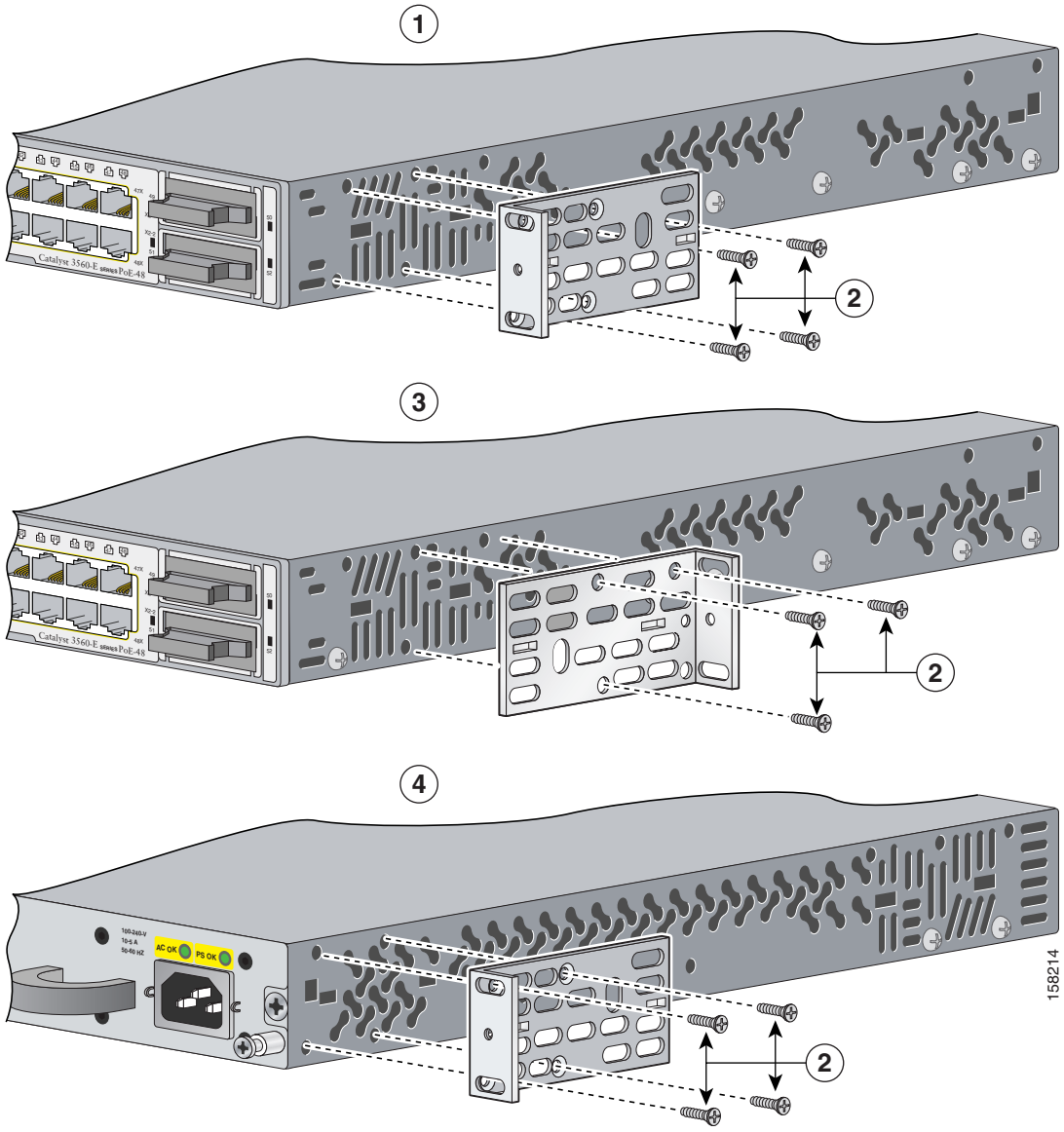
To install the switch in a rack, you must first remove the screws from the switch chassis so that the mounting brackets can be attached. For attachment at the front-mounting position, remove two Phillips truss-head screws from the switch side panels (Figure 2-10). For some switch models, remove only one screw from the side panels. For attachment at the mid-mounting position, remove one screw. For attachment at the rear-mounting position, remove one or two screws depending on the switch model.

Figure 2-10 Removing Screws from the Switch



Use four Phillips flat-head screws to attach the long side of the brackets to the switch for the front- or rear-mounting positions (Figure 2-11). Use three screws to attach the brackets for the mid-mounting position.

Figure 2-11 Attaching Brackets for 19-inch Racks



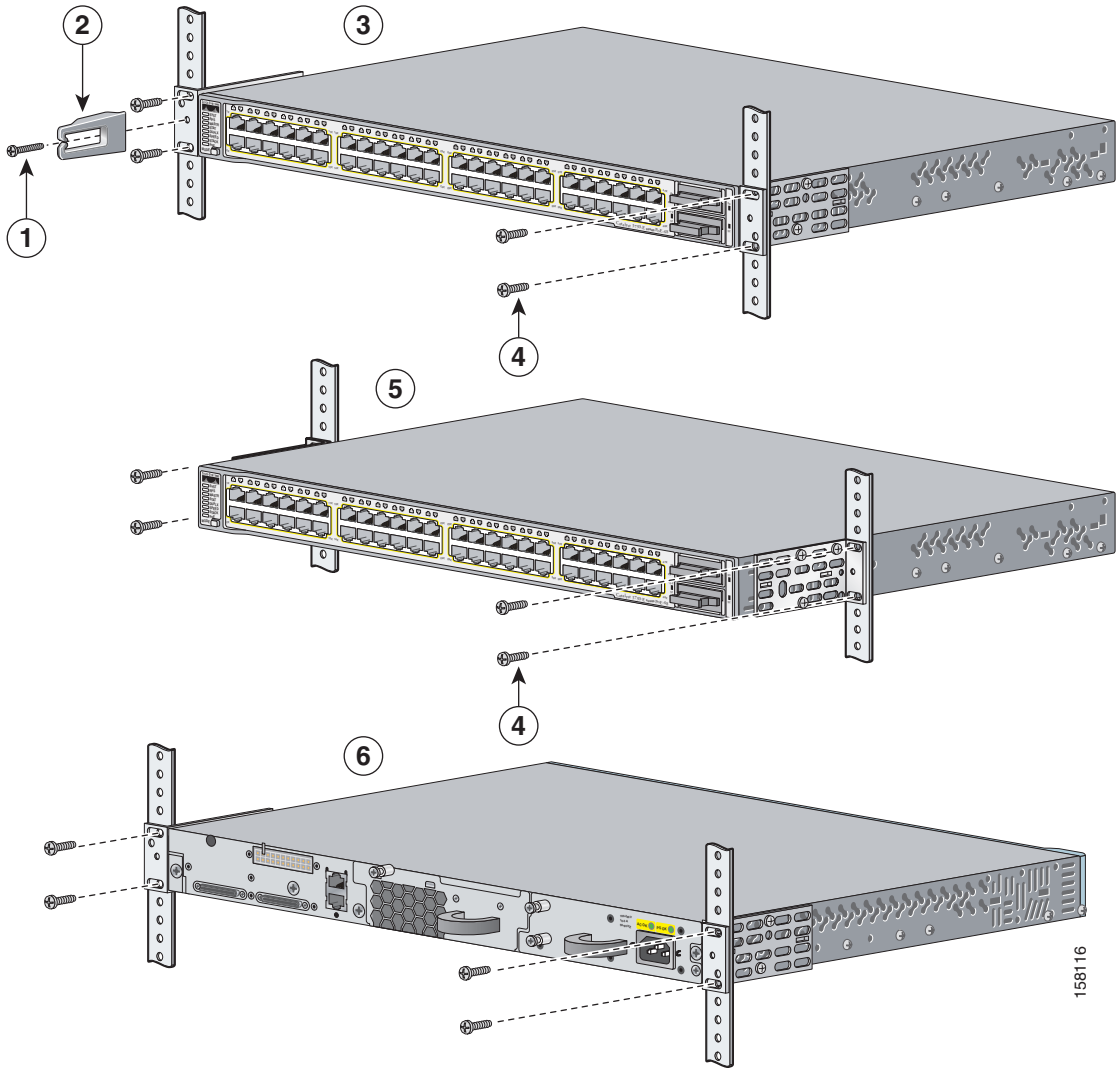
1	Front-mounting position	**3**	Mid-mounting position
2	Number-8 Phillips flat-head screws	**4**	Rear-mounting position

Mounting the Switch in a Rack

After the brackets are attached to the switch, use the four supplied Phillips machine screws to attach the brackets to the rack (Figure 2-12). Use the black Phillips machine screw to attach the cable guide to the left or right bracket.

When you complete the switch installation, see the "After Installing the Switch" section on page 2-17 for more information switch configuration.

Figure 2-12 Mounting the Switch in a Rack



1	Phillips machine screw, black	**4**	Number-12 Phillips machine screws
2	Cable guide	**5**	Mid-mounting position
3	Front-mounting position	**6**	Rear-mounting position

Wall-Mounting

To install the Catalyst 3560E-12D switch on a wall, follow the instructions in these procedures:

- Attaching the Brackets to the Switch for Wall-Mounting, page 2-15
- Mounting the Catalyst 3560E-12D Switch on a Wall, page 2-16

Warning **Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.** Statement 378

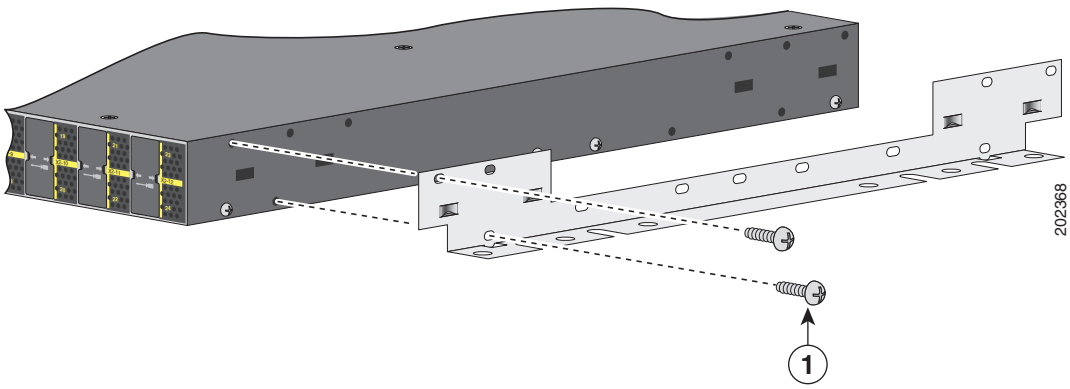
Caution You can only wall-mount the Catalyst 3560E-12D switch. You cannot wall-mount the 24- and 48-port switches or the Catalyst 3560E-12SD switch.

Attaching the Brackets to the Switch for Wall-Mounting

Before installing the brackets on the switch, remove eleven Phillips truss-head screws from the switch side panels. Figure 2-13 shows how to attach the bracket to one side of the switch. Follow the same steps to attach the second bracket to the opposite side.

Caution Do not use the 19-inch brackets to wall-mount the switch. The brackets are not suitable for wall-mounting.

Figure 2-13 Attaching the Brackets for Wall-Mounting (only Catalyst 3560E-12D Switches)

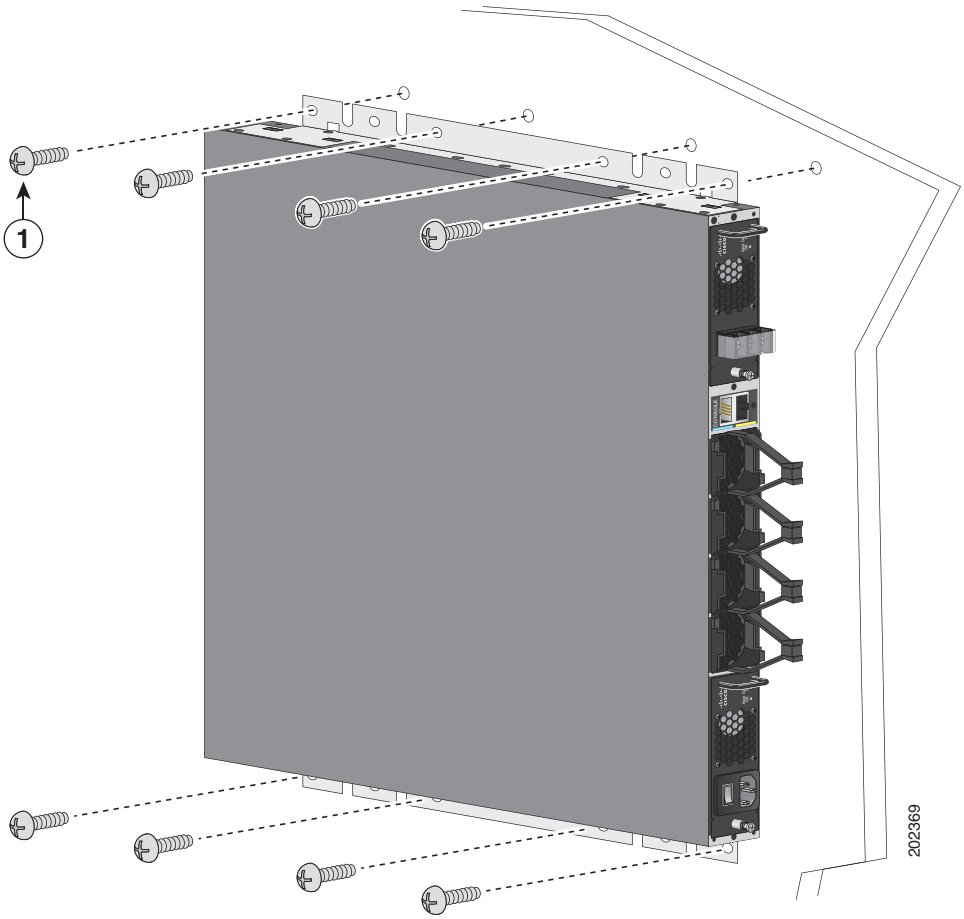


1	Phillips truss-head screws

Mounting the Catalyst 3560E-12D Switch on a Wall

For Catalyst 3560E-12D switches, mount the switch with the *left-side panel facing up*, as shown in Figure 2-14. For the best support of the switch and cables, make sure that the switch is attached securely to wall studs.

Figure 2-14 Wall-Mounting Catalyst 3560E-12D Switches, Left-Side Panel Facing Up



1	User-supplied screws

When you complete the switch installation, see the "After Installing the Switch" section on page 2-17 for more information switch configuration.

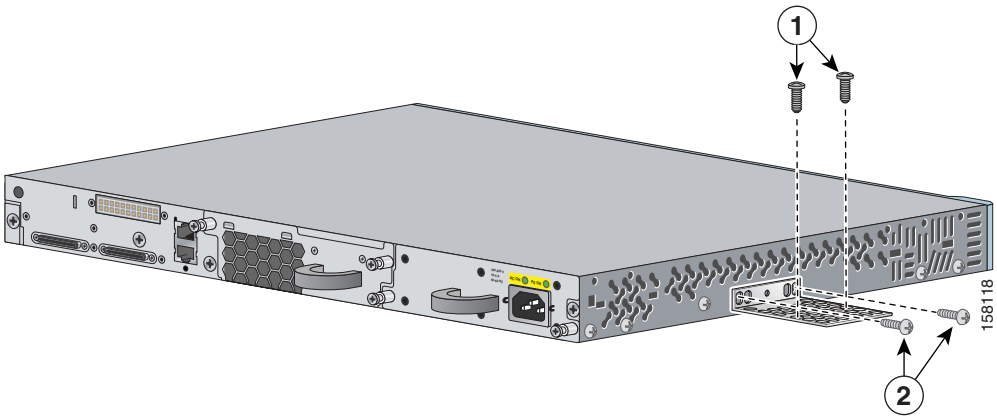
Table- or Shelf-Mounting

To install the switch on a table or shelf, locate the adhesive strip with the rubber feet in the mounting-kit envelope. Attach the four rubber feet to the recessed areas on the bottom of the chassis.

Remove two Phillips truss-head screws from the switch side panels and use those screws to attach the brackets to the switch (Figure 2-15). Secure the brackets to the table or shelf with the appropriate hardware.

Caution Do not use the 19-inch brackets to wall-mount the switch. The brackets are not suitable for wall-mounting.

Figure 2-15 Attaching the 19-inch Brackets for Table- or Shelf-Mounting



1	User-supplied screws	2	Phillips truss-head screws

When you complete the switch installation, see the "After Installing the Switch" section on page 2-17 for more information switch configuration.

After Installing the Switch

After the switch is installed, you might need to:

- Configure the switch by running Express Setup to enter the initial switch configuration. For instructions, see the switch getting started guide that shipped with the switch and also on Cisco.com.
- Use the CLI setup program to enter the initial switch configuration. See Appendix C, "Configuring the Switch with the CLI-Based Setup Program."
- Connect to the front-panel ports. See the "Installing Devices in the 10-Gigabit Ethernet Slots" section on page 2-19 and the "Connecting Devices to the Ethernet Ports" section on page 2-25.

Connecting to the StackWise Ports (Catalyst 3750-E Switches)

Before connecting the StackWise cables, review the "Planning a Switch Stack (Catalyst 3750-E Switches)" section on page 2-6. Always use a Cisco-approved StackWise cable to connect the switches.

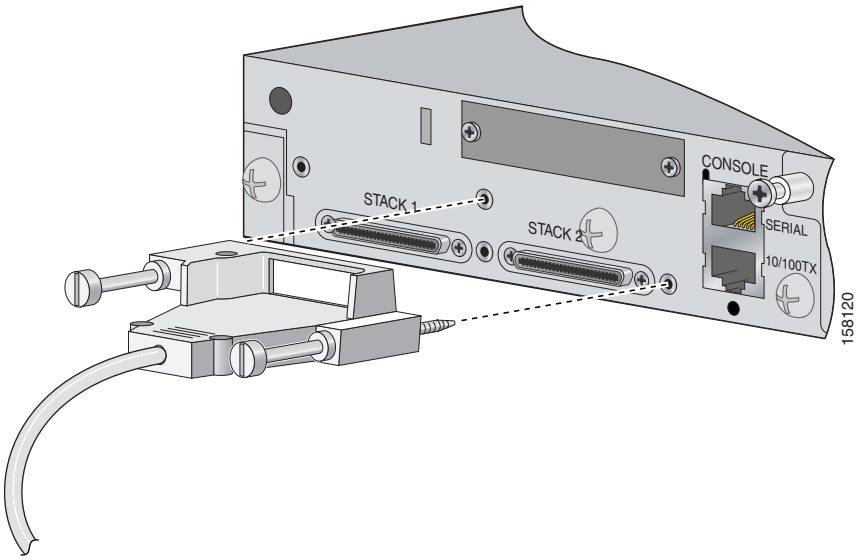
Follow these steps to connect the StackWise cable to the StackWise ports:

Step 1 Remove the dust covers from the StackWise cables and StackWise ports, and store them for future use.

Step 2 Use the window in the StackWise cable to align the connector correctly. Insert the cable into the StackWise port on the back of the switch (Figure 2-16). Using a ratcheting torque screwdriver, tighten the retainer screws to 5 lbf-in. (80 ozf-in.).

Step 3 Insert the other end of the cable into the connector of the other switch, and tighten the retainer screws to 5 lbf-in. (80 ozf-in.). Avoid overtightening the screws.

Figure 2-16 Inserting the StackWise Cable in a StackWise Port



Caution Removing and installing the StackWise cable can shorten its useful life. Do not remove and insert the cable more often than is absolutely necessary.

When you need to remove the StackWise cable from the connector, make sure to fully unscrew the correct screws before removing the connector. When the connectors are not being used, replace the dust covers to protect them from dust.

Installing Devices in the 10-Gigabit Ethernet Slots

These sections describe how to install and remove X2 transceiver modules and the Cisco TwinGig Converter Modules (also known as *converter modules*).

Use only Cisco X2 transceiver modules, converter modules, and SFP modules with the switch. Each Cisco module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the module meets the requirements for the switch.

For more information about installing, removing, cabling, and troubleshooting X2 transceiver modules, see the module documentation that shipped with your device. For module cable specifications, see Appendix B, "Connector and Cable Specifications."

Installing X2 Transceiver Modules and Converter Modules

When installing X2 transceiver modules and converter modules, observe these general precautions:

- When you install or remove the converter module, the mode on the switch changes from 10-Gigabit Ethernet to Gigabit Ethernet or the reverse. During this mode change, data traffic on the other switch uplink ports (X2 transceiver or SFP module ports) might temporarily stop. When you install or remove an X2 transceiver or SFP module, traffic delay does not occur.
- Do not remove the EMC plug from the 10-Gigabit Ethernet slot until you are ready to install an X2 transceiver or a converter module. Either a module or an EMC plug must be installed in the slot at all times.
- Do not remove the dust plugs from the fiber-optic X2 transceiver modules or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
- Removing and installing an X2 module can shorten its useful life. Do not remove and insert any X2 module more often than is absolutely necessary.
- To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.

To install an X2 transceiver module or a converter module, follow these steps:

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Step 2 Remove the module from the protective packaging.

Step 3 Remove the 10-Gigabit Ethernet module slot EMC plug and save.

Caution Verify the correct orientation of your module before inserting it into the slot. Incorrect insertion can damage the module.

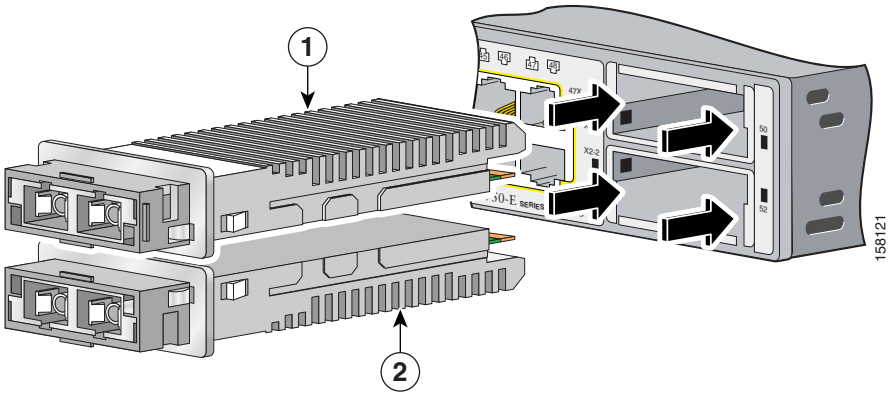
Step 4 For 24- and 48-port switches, position the module face up to install in the upper module slot (slot 1). Position the module face down to install in the lower module slot (slot 2). See Figure 2-17 and Figure 2-19. Slide the module into the opening until the back of the module faceplate is flush with the switch faceplate.

For Catalyst 3560E-12D switches, position the module top facing right to install in a module slot. See Figure 2-18 and Figure 2-20. Slide the module into the opening until the back of the module faceplate is flush with the switch faceplate.

For Catalyst 3560E-12SD switches, position the module face up to install in the upper module slot (slot 1). Position the module face down to install in the lower module slot (slot 2). See Figure 2-17 and Figure 2-19. Slide the module into the opening until the back of the module faceplate is flush with the switch faceplate.

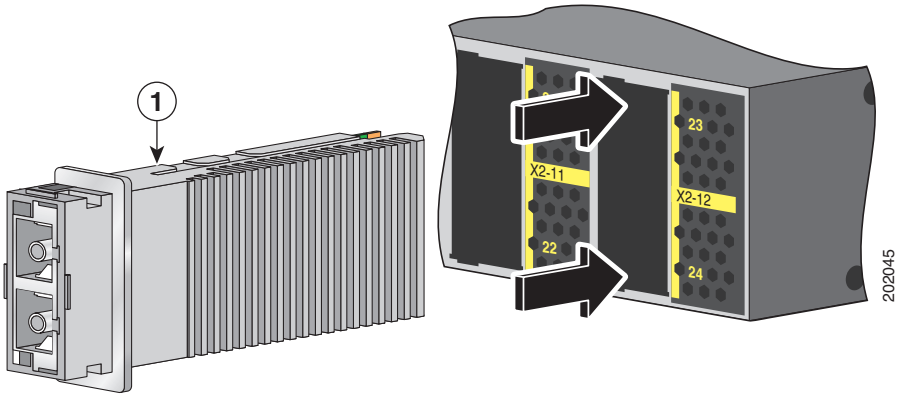
Caution Do not insert or remove an X2 transceiver module with fiber-optic cables attached. An X2 module interface might go into an error-disabled state when an X2 transceiver module is inserted or removed with fiber-optic cables connected to the module. If the interface is in an error-disabled state, you can re-enable the interface by using the **shutdown** and **no shutdown** interface configuration commands.

Figure 2-17 Installing X2 Transceiver Modules in 24- and 48-Port Switches and Catalyst 3560E-12SD Switches



1	Module inserted face up	**2**	Module inserted face down

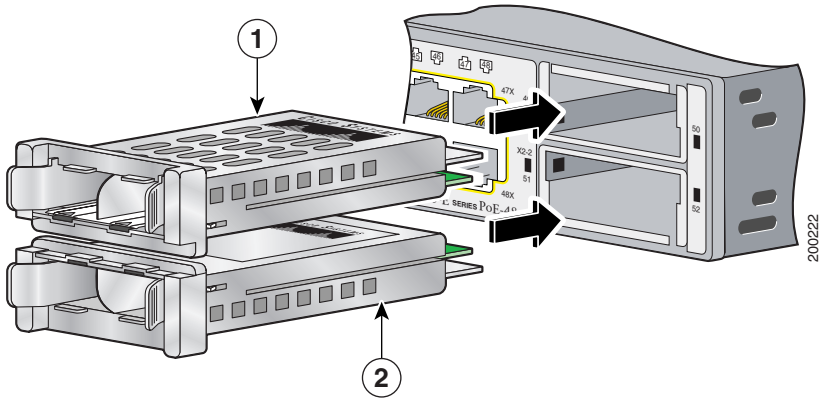
Figure 2-18 Installing X2 Transceiver Modules in Catalyst 3560E-12D Switches



1	Module inserted facing right

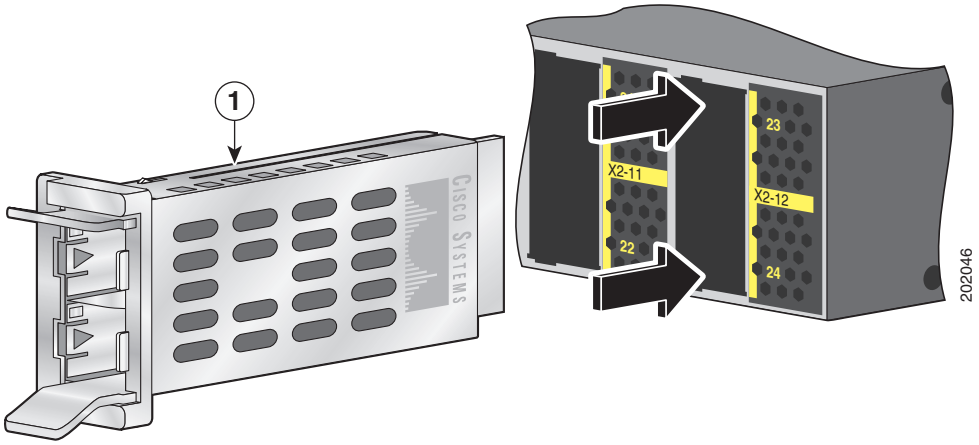
Caution Do not install the converter module with SFP modules or cables connected. Always remove any cables and modules before installing the converter module in the slot.

Figure 2-19 Installing Converter Modules in 24- and 48-Port Switches and Catalyst 3560E-12SD Switches



1	Module inserted face up	2	Module inserted face down

Figure 2-20 Installing Converter Modules in Catalyst 3560E-12D Switches



1	Module inserted facing right

Removing an X2 Transceiver Module or Converter Module

To remove an X2 transceiver module or a converter module, follow these steps:

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Caution Do not insert or remove an X2 transceiver module with fiber-optic cables attached. An X2 module interface might go into an error-disabled state when an X2 transceiver module is inserted or removed with fiber-optic cables connected to the module. If the interface is in an error-disabled state, you can re-enable the interface by using the **shutdown** and **no shutdown** interface configuration commands.

Step 2 For X2 transceiver modules, disconnect the cables from the module. For fiber-optic modules, install the optical bore dust plugs.

Caution Do not remove the converter module with SFP modules or cables installed. Always remove any cables and modules before removing the converter module from the slot.

Step 3 For converter modules, disconnect the cables from the SFP module. Remove the SFP modules from the converter module.

Step 4 Carefully pull on the X2 module sleeve, or pinch the tabs on the converter module to disengage it from the slot. Grasp the edges of the module, and carefully slide it out of the slot.

Step 5 Reinstall a replacement module or an EMC plug in the 10-Gigabit Ethernet slot.

Step 6 Place the module in an antistatic bag or other protective environment.

Installing SFP Modules

This section describes how to install and remove SFP modules in the 3560E-12SD switch slots and in the Cisco TwinGig Converter Module slots. For 24- and 48-port switches and Catalyst 3560E-12D switches, you must have a converter module installed in a 10-Gigabit Ethernet slot to use SFP modules.

See the "SFP Modules" section on page 1-5 and the switch release notes on Cisco.com for the list of SFP modules that the switch supports. Use only Cisco SFP modules on the switch. Each Cisco module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the module meets the requirements for the switch.

For more information about installing, removing, cabling, and troubleshooting SFP modules, see the module documentation that shipped with your device. For module cable specifications, see Appendix B, "Connector and Cable Specifications."

Installing an SFP Module

When installing SFP modules, observe these general precautions:

- Do not remove the dust plugs from the SFP modules or the rubber caps from the fiber-optic cable until you are ready to connect the cable. The plugs and caps protect the module ports and cables from contamination and ambient light.
- Removing and installing an SFP module can shorten its useful life. Do not remove and insert any SFP module more often than is absolutely necessary.
- To prevent ESD damage, follow your normal board and component handling procedures when connecting cables to the switch and other devices.

To install an SFP module, follow these steps:

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Caution To avoid damage to the converter module, first install the converter module in the switch 10-Gigabit Ethernet slot before installing the SFP modules.

Step 2 For switches without SFP module slots, install a converter module in the 10-Gigabit Ethernet module slot as described in the "Installing X2 Transceiver Modules and Converter Modules" section on page 2-19.

Step 3 Find the send (TX) and receive (RX) markings that identify the top side of the SFP module.

On some SFP modules, the send and receive (TX and RX) markings might be replaced by arrows that show the direction of the connection, either send or receive (TX or RX).

Step 4 If the SFP module has a bale-clasp latch, move it to the open, unlocked position.

Step 5 For 24- and 48-port switches, position the SFP module face up to install in the upper converter module slot (slot 1). Position the module face down to install in the lower converter module slot (slot 2). See Figure 2-21.

For Catalyst 3560E-12D switches, position the SFP module top facing right to install in a converter module slot. See Figure 2-22.

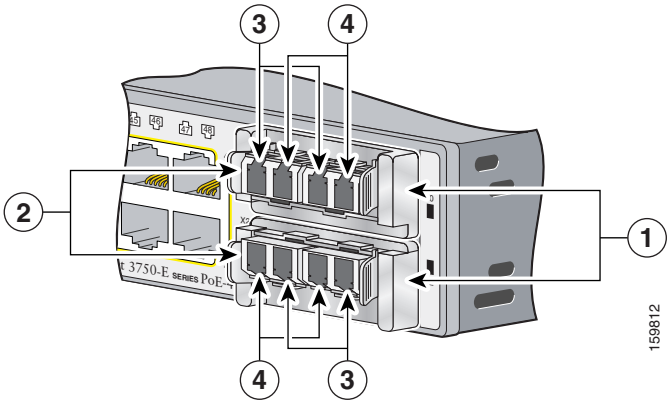
For Catalyst 3560E-12SD switches, position the SFP module face up to install it in a module slot. See Figure 2-23. For an example of installing SFPs in a converter module, see Figure 2-21.

Step 6 If the module has a bale-clasp latch, close it to lock the SFP module in place.

Step 7 Remove the SFP dust plugs and save.

Step 8 Connect the SFP cables.

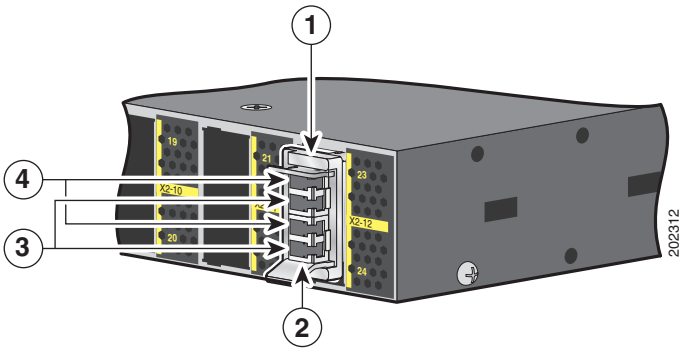
Figure 2-21 Converter Module with SFP Modules Installed in 24- and 48-port Switches and Catalyst 3560E-12SD Switches



1	Converter modules	**3**	Send (TX) optical bore
2	SFP modules[1]	**4**	Receive (RX) optical bore

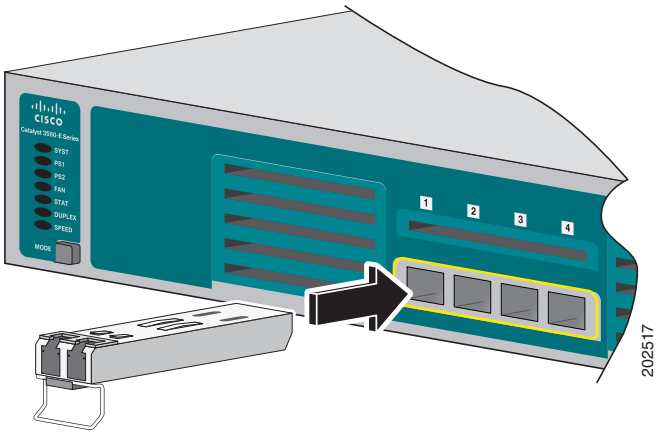
1. Lower SFP modules are inverted on 24- and 48-port switches.

Figure 2-22 Converter Module with SFP Modules Installed in Catalyst 3560E-12D Switches



1	Converter module	**3**	Send (TX) optical bore
2	SFP modules	**4**	Receive (RX) optical bore

Figure 2-23 Installing an SFP Module in Catalyst 3560E-12SD Switches



Removing an SFP Module

To remove an SFP module from a module slot, follow these steps:

Step 1 Attach an ESD-preventive wrist strap to your wrist and to a bare metal surface.

Step 2 Disconnect the cable from the SFP module. For reattachment, note which cable connector plug is send (TX) and which is receive (RX).

Step 3 Insert a dust plug into the optical ports of the SFP module to keep the optical interfaces clean.

Step 4 If the module has a bale-clasp latch, pull the bale out and down to eject the module. If the bale-clasp latch is obstructed and you cannot use your index finger to open it, use a small, flat-blade screwdriver or other long, narrow instrument to open the bale-clasp latch.

Step 5 Grasp the SFP module, and carefully remove it from the module slot.

Step 6 Place the removed SFP module in an antistatic bag or other protective environment.

Connecting Devices to the Ethernet Ports

This section includes these topics:

- 10/100/1000 Ethernet Port Connections, page 2-26
- PoE Port Connections, page 2-26

Caution Category 5e and Category 6 cables can store high levels of static electricity. Always ground the cables to a suitable and safe earth ground before connecting them to the switch or other devices.

10/100/1000 Ethernet Port Connections

The 10/100/1000 Ethernet ports use standard RJ-45 connectors with Ethernet pinouts. The maximum cable length is 328 feet (100 meters). The 100BASE-TX and 1000BASE-T traffic requires Category 5, Category 5e, or Category 6 UTP cable. The 10BASE-T traffic can use Category 3 or Category 4 cable.

The autonegotiation feature is enabled by default on the switch. At this setting, the switch ports configure themselves to operate at the speed of attached device. If the attached device does not support autonegotiation, you can explicitly set the switch port speed and duplex parameters. To maximize performance, either let the ports autonegotiate both speed and duplex, or set the port speed and duplex parameters on both ends of the connection.

For simplified cabling, the automatic medium-dependent interface crossover (auto-MDIX) feature is enabled by default on the switch. With auto-MDIX enabled, the switch detects the required cable type for copper Ethernet connections and configures the interface accordingly. Therefore, you can use either a crossover or a straight-through cable for connections to a switch 10/100/1000 Ethernet port regardless of the type of device on the other end of the connection.

See the switch software configuration guide or the switch command reference on Cisco.com for more information about enabling or disabling autonegotiation and auto-MDIX.

If auto-MDIX is disabled, use the guidelines in Table 2-1 to select the correct cable for connecting the switch 10/100/1000 Ethernet ports to other devices. See the "Cable and Adapter Specifications" section on page B-5 for cable-pinout descriptions.

Table 2-1 Recommended Ethernet Cables (When Auto-MDIX is Disabled)

Device	Crossover Cable[1]	Straight-Through Cable[1]
Switch to switch	Yes	No
Switch to hub	Yes	No
Switch to computer or server	No	Yes
Switch to router	No	Yes
Switch to IP phone	No	Yes

1. 100BASE-TX and 1000BASE-T traffic requires twisted four-pair, Category 5, Category 5e, or Category 6 cable. 10BASE-T traffic can use Category 3 or Category 4 cable.

PoE Port Connections

The 10/100/1000 PoE ports have the same autonegotiation settings and cabling requirements that are described in the "10/100/1000 Ethernet Port Connections" section on page 2-26.

The PoE ports provide PoE support for devices compliant with IEEE 802.3af and also provide Cisco pre-standard PoE support for Cisco IP Phones and Cisco Aironet Access Points.

Each port can deliver up to 15.4 W of PoE. With the 1150-W power-supply module, the Catalyst 3750E-48PS and Catalyst 3560E-48PS switches can deliver 15.4 W on all 48 ports. With the 750-W power-supply module, the switches can deliver 15.4 W of PoE on any 24 of the 48 ports, or any combination of the ports can deliver an average of 7.7 W of PoE at the same time, up to a maximum switch power output of 370 W. On a per-port basis, you can control whether or not a PoE port automatically provides power when an IP phone or an access point is connected.

Note On 48-port PoE switches, you must use the 1150-W power-supply module to provide full 15.4-W capability across all 48 ports.

To access an advanced PoE planning tool, use the Cisco Power Calculator available on Cisco.com at this URL:

http://tools.cisco.com/cpc/launch.jsp

You can use this application to calculate the power supply requirements for a specific PoE configuration. The results show output current, output power, and system heat dissipation.

You must be a registered Cisco.com user to access the Cisco Power Calculator. If you do not have a user ID or password, you can register at this URL:

http://tools.cisco.com/RPF/register/register.do

For more information about the required power-supply module and the PoE specifications, see the "Power-Supply Modules" section on page 1-15, and Appendix A, "Technical Specifications."

Note Many legacy powered devices, including older Cisco IP phones and access points that do not fully support IEEE 802.3af, might not support PoE when connected to the switches by a crossover cable.

Caution PoE faults are caused when noncompliant cabling or powered devices are connected to a PoE port. Only standard-compliant cabling can be used to connect Cisco pre-standard IP Phones and wireless access points or IEEE 802.3af-compliant devices to PoE ports. A cable or device that causes a PoE fault must be removed from the network.

Warning **Voice over IP (VoIP) service and the emergency calling service do not function if power fails or is disrupted. After power is restored, you might have to reset or reconfigure equipment to regain access to VoIP and the emergency calling service. In the USA, this emergency number is 911. You need to be aware of the emergency number in your country.** Statement 361

Warning **Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security.** Statement 1072

Where to Go Next

If the default configuration is satisfactory, the switch does not need further configuration. You can use any of these management options to change the default configuration:

- Start the device manager, which is in the switch memory, to manage individual and standalone switches. This is an easy-to-use web interface that offers quick configuration and monitoring. You can access the device manager from anywhere in your network through a web browser. For more information, see the switch getting started guide and the device manager online help.
- Start the Network Assistant application, which is described in the *Getting Started with Cisco Network Assistant* guide. Through this GUI, you can configure and monitor a switch cluster or an individual switch.
- Use the CLI to configure the switch as a member of a cluster or as an individual switch from the console. See the switch command reference on Cisco.com for information on using the CLI with the switch.
- Start an SNMP application such as the CiscoView application.

CHAPTER 3

Power Supply and Fan Module Installation

This chapter describes how to remove and install a new or replacement power supply or fan module in a Catalyst 3750-E or Catalyst 3560-E switch. See these sections:

- Installation Overview, page 3-1
- Installing an AC-Power Supply, page 3-3
- Installing a DC-Power Supply, page 3-4
- Installing a Fan Module, page 3-10

Installation Overview

This section describes the tools and equipment needed for installation, the applicable safety warnings, and the installation guidelines:

- Tools and Equipment, page 3-1
- Installation Guidelines, page 3-1

Tools and Equipment

Obtain these necessary tools and equipment:

- Ratcheting torque screwdriver with a number-2 Phillips head that exerts up to 15 pound-force inches (lbf-in.) or 240 ounce-force inches (ozf-in.) of pressure. For 1150-W power-supply modules, the screwdriver shaft length should be at least 6-inches long.
- Power-supply power-cord retainer assembly in the switch accessory kit.

Installation Guidelines

Table 1-11 and Table 1-13 list the switches and the compatible power-supply modules. Observe these guidelines when removing or installing a power supply or fan module:

- Do not force the power supply or fan module into the slot. This can damage the pins on the switch if they are not aligned with the module.
- A power supply or fan module that is only partially connected to the switch can disrupt the system operation.

- Remove power from the power-supply module before removing or installing the module.
- The 24- and 48-port switch supports hot swapping of the power supply when the switch is connected to an RPS 2300. You can remove and replace the power supply without interrupting normal switch operation. When you insert a new power supply in the switch, there is a 5-second delay while the switch software polls the device. The switch power supply then automatically provides power, and the RPS 2300 is available to power other devices.
- The Catalyst 3560E-12D and 3560E-12SD switches support hot swapping of a power-supply module when one of the two power supplies is active. You can remove and replace the power supply without interrupting normal switch operation. When you insert a new power supply in the switch, there is a 5-second delay while the switch software polls the device.
- The Catalyst 3560E-12D and 3560E-12SD switches can operate with only one active power-supply module. However, two power supply modules must always be physically installed in the switch rear panel when the switch is operating, even if one module is defective. This is required to maintain adequate airflow in the chassis and prevent overheating. When the switch is running on only one power-supply module, redundant failover and load sharing is not available.

Caution Do not operate the Catalyst 3560E-12D or 3560E-12SD switch with one power-supply module removed from the rear panel. For proper chassis cooling, two power-supply modules must be installed in the switch rear panel.

- For the Catalyst 3560E-12D and 3560E-12SD switch power-supply modules, we recommend that you connect the power-supply modules to separate AC or DC circuits for optimal power reliability.
- The switch supports hot swapping of a fan module. When replacing a fan, you should complete the replacement procedure within 2 minutes to avoid overheating the switch.
- The Catalyst 3560E-12D and 3560E-12SD switch continues to operate when there is one failed fan, either a power-supply fan or a chassis cooling fan. If one fan fails, the switch returns an error message. If a second fan fails, either a power supply fan or a chassis cooling fan, the switch returns an error message, writes a failure log to flash memory, and shuts down.
- Make sure that all power supply and fan module captive screws are tightened before moving the switch.
- When replacing the 24- and 48-port switch 1150-W or 750-W power supply, verify that you are using the correct power cord (CAB-16AWG-AC, only in North America).

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.** Statement 206

Warning **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

Installing an AC-Power Supply

To remove and install an AC-powered power-supply module, follow these steps:

Step 1 Turn off the power at its source. For Catalyst 3560E-12D and 3560E-12SD switches, also turn off the power supply on/off switch.

Step 2 If used, detach the power cord retainer assembly from the power cord.

Step 3 Remove the power cord from the power connector.

Step 4 For 24- and 48-port switches, use a Phillips screwdriver to loosen the two captive screws at the lower edge that secure the power supply to the switch chassis (Figure 3-1).

For Catalyst 3560E-12D and 3560E-12SD switches, use a Phillips screwdriver to loosen the captive screw at the left edge of the power supply (Figure 3-2).

Caution Do not leave the power-supply slot open for more than 90 seconds while the switch is operating.

Step 5 Remove the power-supply module from the power slot by pulling on the extraction handle.

Step 6 Insert the new power supply into the power-supply slot, and gently push it into the slot (Figure 3-1 and Figure 3-2). When correctly inserted, the power supply is flush with the switch rear panel. The 1150-W power-supply module extends 3.6 inches (9.14 cm) from the switch rear panel.

Figure 3-1 Inserting the AC-Power Supply in 24- and 48-Port Switches

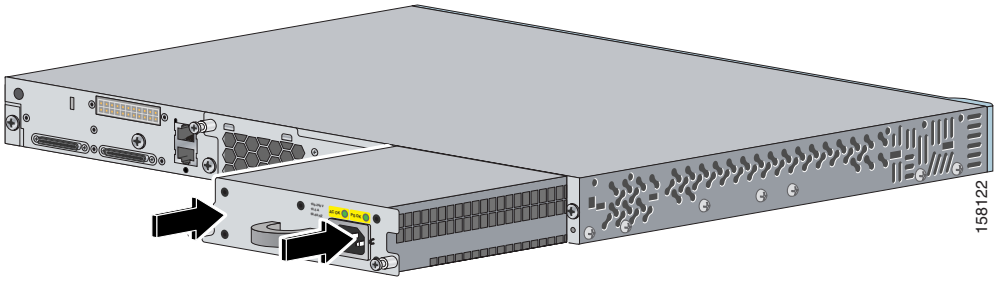
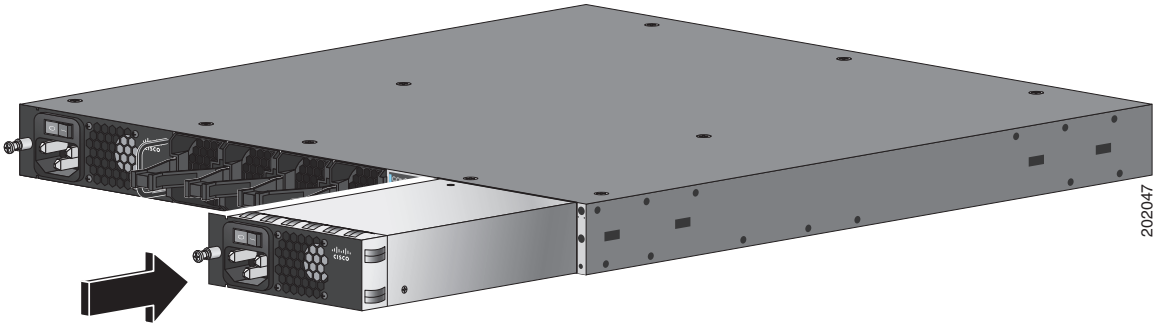


Figure 3-2 Inserting the AC-Power Supply in Catalyst 3560E-12D and 3560E-12SD Switches (Catalyst 3560E-12D Switch Shown)

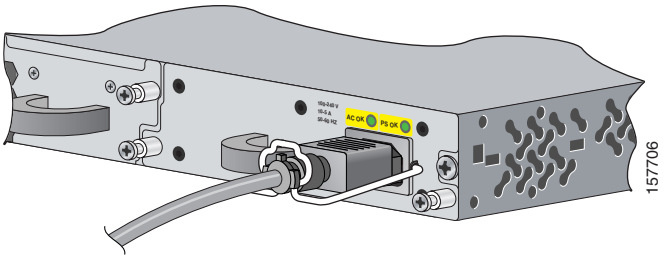


Step 7 For 24- and 48 port switches, align the two captive screws with the screw holes. Using a ratcheting torque screwdriver, torque each screw to 7 lbf-in. (112 ozf-in.).

For Catalyst 3560E-12D and 3560E-12SD switches, align the captive screw with the screw hole. Using a ratcheting torque screwdriver, torque the screw to 4 lbf-in. (64 ozf-in.)

Step 8 (Optional) Assemble the AC power cord retainer with the large end of the plastic bushing facing away from the switch. Position the assembly on the power cord, and insert the wire bales into the slots on the switch rear panel (Figure 3-3).

Figure 3-3 AC-Power Supply with Power Cord Retainer



Step 9 Connect the power cord to the power supply and to an AC-power outlet. Turn on the power at the power source. For Catalyst 3560E-12D and 3560E-12SD switches, also turn on the power supply on/off switch.

Step 10 For 24- and 48-port switches, confirm that the power supply *AC OK* LED is green. See Table 1-12 for a description of the module LEDs.

For Catalyst 3560E-12D and 3560E-12SD switches, confirm that the power supply *Input OK* LED is green. See Table 1-14 for a description of the power supply LEDs.

Installing a DC-Power Supply

To connect the switch to a DC-input power source, follow these steps:

1. Preparing for Installation, page 3-5
2. Grounding the Switch, page 3-5
3. Installing the DC Power Supply in the Switch, page 3-8
4. Wiring the DC-Input Power Source, page 3-9

Warning **An exposed wire lead from a DC-input power source can conduct harmful levels of electricity. Be sure that no exposed portion of the DC-input power source wire extends from the terminal block plug.** Statement 122

Warning **Before connecting or disconnecting ground or power wires to the chassis, ensure that power is removed from the DC circuit. To ensure that all power is OFF, locate the circuit breaker on the panel board that services the DC circuit, switch the circuit breaker to the OFF position, and tape the switch handle of the circuit breaker in the OFF position. Use a voltmeter to test for 0 (zero) voltage at the power terminals on the chassis.** Statement 196

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 15 A.** Statement 1005

Warning **A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.** Statement 1022

Note The grounding architecture of this product is DC-isolated (DC-I)

Preparing for Installation

Obtain these necessary tools and equipment:

- Ratcheting torque screwdriver with a number-2 and a number-1 Phillips head that exerts up to 15 pound-force inches (lbf-in.) or 240 ounce-force inches (ozf-in.) of pressure.
- Panduit crimping tool with optional controlled-cycle mechanism (model CT-720, CT-920, CT-920CH, CT-930, or CT-940CH).
- Wire-stripping tools.
- 12-gauge copper ground wire (insulated or noninsulated) when using the single-ground connection.
- 6-gauge copper ground wire (insulated or noninsulated) when using the dual-ground connection.
- Ground lug screw and lug ring in the switch accessory kit. For a dual-ground connection on 24- and 48-port switches, also use the dual-ground adaptor and dual-hole lug from the DC power supply accessory kit.
- Four leads of 16-gauge copper wire.
- Four round eyelet terminals or four fork-type terminals from the DC power supply accessory kit.

Grounding the Switch

To make sure that the equipment is reliably connected to earth ground, follow the grounding procedure instructions and observe these warnings:

Warning **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

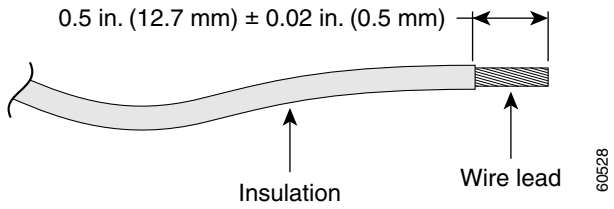
Warning **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

Follow these steps to install either a single-ground lug or a dual-ground lug on the switch. Make sure to follow any grounding requirements at your site.

Step 1 Locate the ground lug screw and the lug ring in the switch accessory kit. For a dual-ground connection, locate the dual-ground adaptor (only 24- and 48-port switches) and dual-hole lug that ships with the DC-power-supply module.

Step 2 If your ground wire is insulated, use a wire stripping tool to strip the 12-gauge or 6-gauge ground wire to 0.5 inch (12.7 mm) ± 0.02 inch (0.5 mm) (Figure 3-4). Use 12-gauge copper ground wire for the single-ground connection. Use 6-gauge copper ground wire for the dual-ground connection.

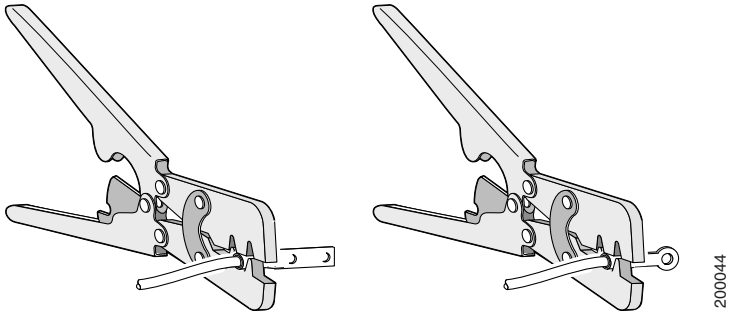
Figure 3-4 Stripping the Ground Wire



Step 3 Slide the open end of the ground lug over the exposed area of the wire.

Step 4 Using a Panduit crimping tool, crimp the ground lug to the wire (Figure 3-5).

Figure 3-5 Crimping the Ground Lug



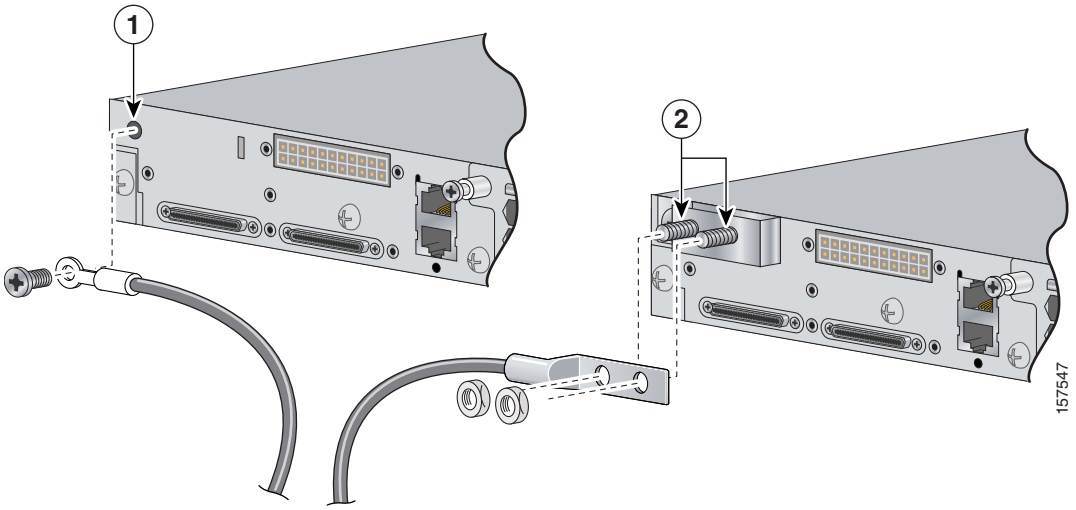
Step 5 For 24- and 48-port switches, use the ground screw to attach the single-ground lug and the wire assembly or the dual-ground adaptor to the switch rear panel. For a dual-ground adaptor, attach the dual-hole lug and the wire assembly to the adaptor with the supplied nuts (Figure 3-6 and Figure 3-7).

For Catalyst 3560E-12D and 3560E-12SD switches, use the ground screw to attach the single-ground lug and the wire assembly, or use two ground screws to attach the dual-ground lug and the wire assembly to the switch rear panel.

Step 6 Using a ratcheting torque screwdriver, torque the ground-lug screws to 60 lbf-in. (960 ozf-in.) (Figure 3-6 and Figure 3-7).

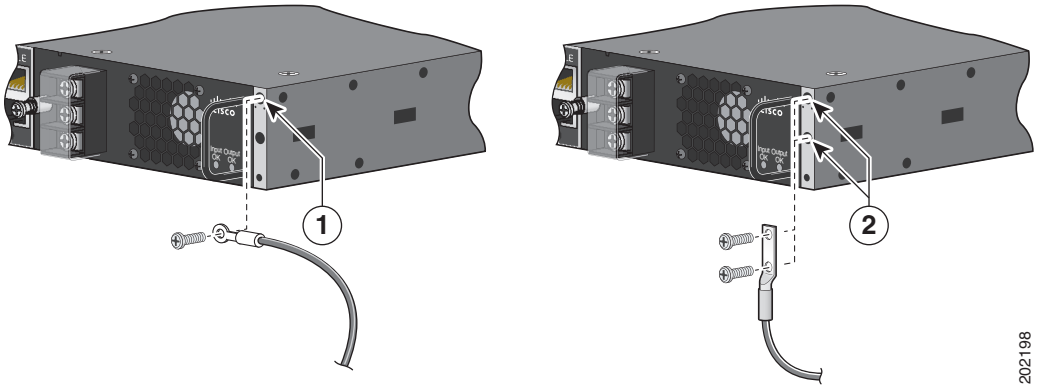
Step 7 Connect the other end of the grounding wire to an appropriate grounding point at your site or to the rack.

Figure 3-6 Attaching the Ground Lug and Wire Assembly on 24- and 48-Port Switches



1	Single-ground screw and lug ring
2	Dual-ground adaptor and dual-hole lug

Figure 3-7 Attaching the Ground Lug and Wire Assembly on Catalyst 3560E-12D and 3560E-12SD Switches (Catalyst 3560E-12D Switch Shown)



1	Single-ground screw and lug ring[1]
2	Dual-ground screw and lug ring[1]

1. See Figure 1-9 for the Catalyst 3560E-12SD ground location.

Installing the DC Power Supply in the Switch

To remove and install a DC-powered power-supply module, follow these steps:

Step 1 Turn off power at the DC circuits. To ensure that power is removed from the DC circuits, locate the circuit breakers for the DC circuits, switch the circuit breakers to the OFF position, and tape the circuit-breaker switches in the OFF position.

Step 2 Use a number-2 Phillips screwdriver to remove the plastic safety cover from the power supply terminal blocks.

Step 3 Use a number-1 Phillips screwdriver to remove the DC-input power wires from the power terminals.

Step 4 For 24- and 48-port switches, use a Phillips screwdriver to loosen the two captive screws at the lower edge that secure the power-supply module to the switch chassis.

For Catalyst 3560E-12D and 3560E-12SD switches, use a Phillips screwdriver to loosen the captive screw at the left edge of the power-supply module.

Step 5 Remove the power-supply module from the power slot by pulling on the extraction handle.

Step 6 Insert the new power supply into the power-supply slot, and gently push it into the slot (Figure 3-8 and Figure 3-9). When correctly inserted, the power supply is flush with the switch rear panel.

Figure 3-8 Inserting the DC-Power Supply in 24- and 48-Port Switches

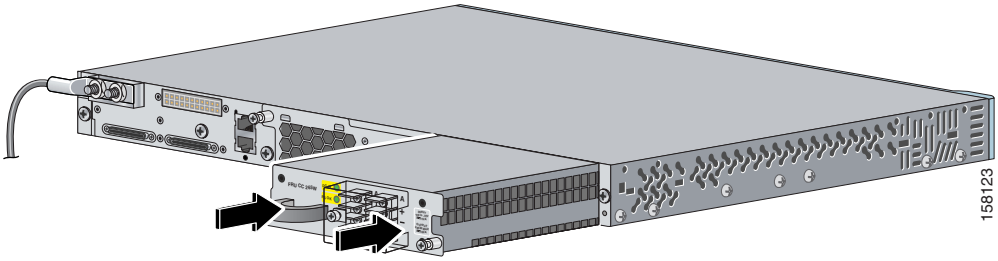
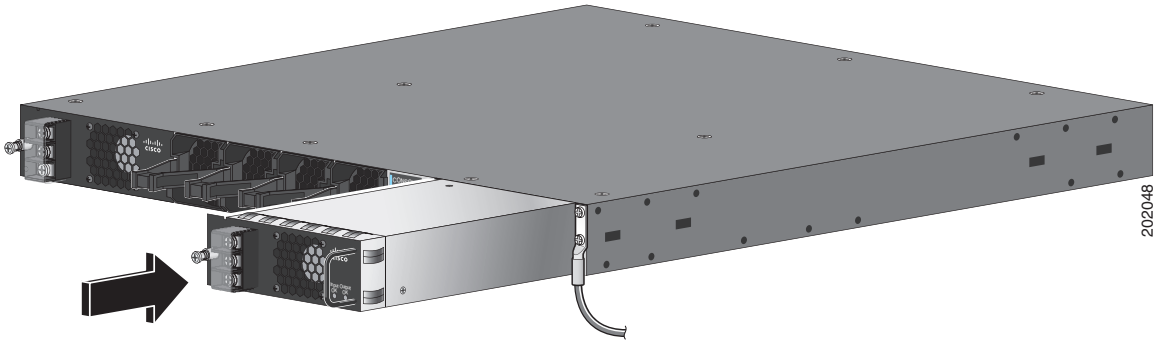


Figure 3-9 Inserting the DC-Power Supply in Catalyst 3560E-12D and 3560E-12SD Switches (Catalyst 3560E-12D Switch Shown)



Step 7 For 24- and 48 port switches, align the two captive screws with the screw holes. Using a ratcheting torque screwdriver, torque each screw to 7 lbf-in. (112 ozf-in.).

For Catalyst 3560E-12D and 3560E-12SD switches, align the captive screw with the screw hole. Using a ratcheting torque screwdriver, torque the screw to 4 lbf-in. (64 ozf-in.)

Step 8 Connect the input power as described in the "Wiring the DC-Input Power Source" section.

Wiring the DC-Input Power Source

To wire the DC-power-supply module to a DC-input power source, follow these steps.

Step 1 Using a wire-stripping tool, strip each of the four wires coming from the DC-input power source to the appropriate length for either the round eyelet or the fork-type terminals.

Step 2 Using a Panduit crimping tool, crimp the terminals to the 16-gauge DC-power input wires.

Step 3 Connect the DC-input power terminals to the terminal blocks as shown in Figure 3-10 or Figure 3-11. Make sure to match the polarity (negative to negative, positive to positive) when connecting the wires to the terminal blocks.

Figure 3-10 DC Source A Isolated From Source B with No Common Ground, 24- and 48-port Switches

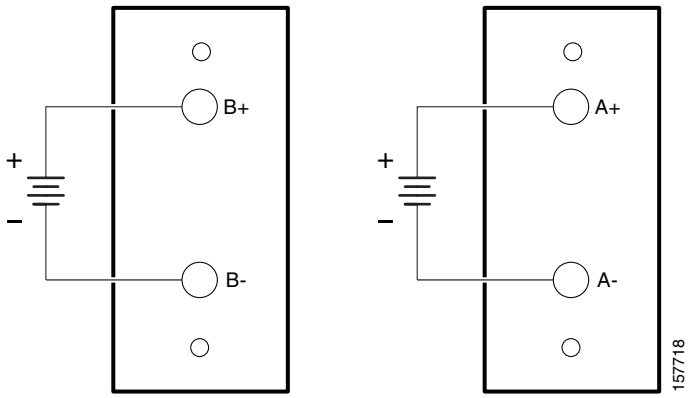
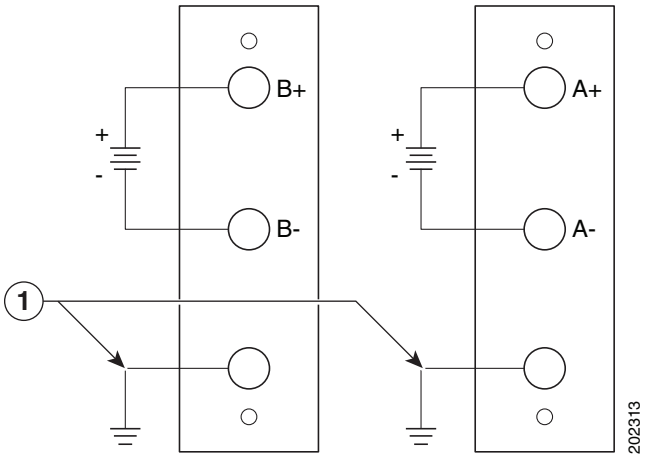


Figure 3-11 DC Source A and Source B Connections, Catalyst 3560E-12D and 3560E-12SD Switches



1	Connect to grounded metal rack, or connect to earth ground if the switch is not installed in a grounded rack.

Step 4 Torque all terminal block screws to 5 lbf-in. (80 ozf-in.).

Step 5 Replace the terminal block plastic safety cover. For 24- and 48-port switches, torque the safety-cover screw to 10 lbf-in. (160 ozf-in.).

Step 6 Move the DC-power source circuit-breaker handles to the ON position.

Step 7 For 24- and 48-port switches, confirm that the power-supply *DC OK* LED is green. See Table 1-12 for a description of the module LEDs.

For Catalyst 3560E-12D and 3560E-12SD switches, confirm that the power-supply *Input OK* LED is green. See Table 1-14 for a description of the power supply LEDs.

Installing a Fan Module

To remove and install a fan module, follow these steps:

Step 1 For 24- and 48-port switches, use a number-2 Phillips screwdriver to loosen the two captive screws that secure the fan module to the switch chassis.

Caution You should replace the fan module within 2 minutes to avoid overheating the switch.

Step 2 For 24- and 48-port switches, remove the fan module by pulling on the extraction handle.

For Catalyst 3560E-12D and 3560E-12SD switches, remove the fan module by pinching and then pulling the extraction handle.

Step 3 For 24- and 48-port switches, insert the new fan module into the fan slot, and gently push it into the slot (Figure 3-12). When correctly inserted, the fan module is flush with the switch rear panel.

For Catalyst 3560E-12D and 3560E-12SD switches, insert the new fan module into the fan slot, and gently push it into the slot until the fan latches (Figure 3-13). When correctly inserted, the fan module LED turns on.

Step 4 For 24- and 48-port switches, align the two captive screws with the screw holes in the switch rear panel. Using a ratcheting torque screwdriver, torque each screw to 5 lbf-in. (80 ozf-in.).

Warning **Do not reach into a vacant slot or chassis while you install or remove a module or a fan. Exposed circuitry could constitute an energy hazard.** Statement 206

Figure 3-12 Inserting the Fan Module in 24- and 48-Port Switches

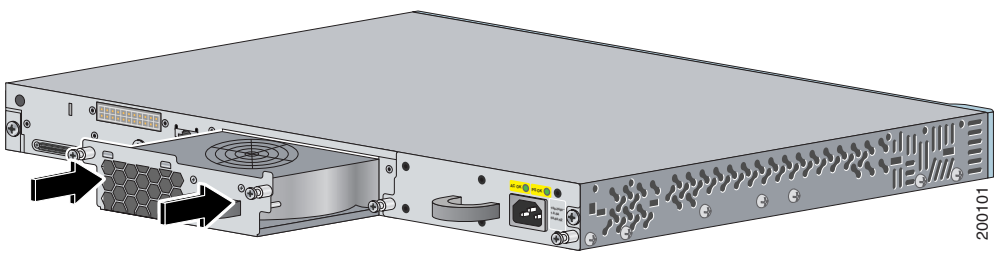


Figure 3-13 Inserting the Fan Module in Catalyst 3560E-12D and 3560E-12SD Switches (Catalyst 3560E-12D Switch Shown)

CHAPTER 4

Troubleshooting

This chapter describes these Catalyst 3750-E and Catalyst 3560-E switch troubleshooting topics:

- Diagnosing Problems, page 4-1
- How to Clear the Switch IP Address and Configuration, page 4-5
- Finding the Switch Serial Number, page 4-6
- How to Replace a Failed Stack Member, page 4-6

Diagnosing Problems

The LEDs on the front panel provide troubleshooting information about the switch. They show POST failures, port-connectivity problems, and overall switch performance. You can also get statistics from the device manager, from the CLI, or from an SNMP workstation. See the software configuration guide, the switch command reference guide on Cisco.com, or the documentation that came with your SNMP application for details.

Check Switch POST Results

As the switch powers on, it begins the power-on self-test (POST), a series of tests that runs automatically to ensure that the switch functions properly. It might take several minutes for the switch to complete POST.

When the switch begins POST, the switch status LEDs turn green. The System LED blinks green, and the other LEDs remain continuous green.

When POST completes successfully, the System LED remains green. The RPS LED remains green for some time and then returns to its operating status. The other LEDs turn off and return to their operating status. If the switch fails POST, the System and Ethernet management port LEDs are amber.

Note POST failures are usually fatal. Contact your Cisco technical support representative if your switch does not pass POST.

Check Switch LEDs

If you have physical access to the switch, look at the port LEDs for troubleshooting information about the switch. See the "LEDs" section on page 1-6 for a description of the LED colors and their meanings.

Check Switch Connections

Review this section when troubleshooting switch connection problems.

Bad or Damaged Cable

Always check the cable for marginal damage or failure. A cable might be just good enough to connect at the physical layer, but it could corrupt packets as a result of subtle damage to the wiring or connectors. You can identify this situation because the port has many packet errors or the port constantly flaps (loses and regains link). You should:

- Check or swap the copper or fiber-optic cable with a known, good cable.
- Look for broken or missing pins on cable connectors.
- Rule out any bad patch panel connections or media convertors between the source and destination. If possible, bypass the patch panel or eliminate faulty media convertors (fiber-optic-to-copper).
- Try the cable in another port or interface, if possible, to see if the problem follows the cable.
- Catalyst 3750-E switch StackWise cable: remove and inspect the cable and StackWise port for bent pins or damaged connectors. If the StackWise cable is bad, replace it with a known good cable.

Ethernet and Fiber Cables

Make sure that you have the correct cable type for the connection:

- For Ethernet, use Category 3 copper cable for 10 Mbps UTP connections. Use either Category 5, Category 5e, or Category 6 UTP for 10/100 or 10/100/1000 Mbps connections.
- For fiber-optic connectors, verify that you have the correct cable for the distance and port type. Make sure that the connected device ports both match and use the same type encoding, optical frequency, and fiber type. For more information about cabling, see the "10-Gigabit Ethernet X2 Transceiver Module Cable Specifications" section on page B-5 and the "SFP Module Cable Specifications" section on page B-6.
- For copper connections, determine if a crossover cable was used when a straight-through was required, or the reverse. Enable auto-MDIX on the switch, or replace the cable. See the Table 2-1 for recommended Ethernet cables.

Link Status

Verify that both sides have link. A single broken wire or one shutdown port can cause one side to show link, but the other side does not have link.

A link LED does not guarantee that the cable is fully functional. The cable might have encountered physical stress that causes it to function at a marginal level. If the link light for the port does not come on:

- Connect the cable from the switch to a known good device.
- Make sure that both ends of the cable are connected to the correct ports.

- Verify that both devices have power.
- Verify that you are using the correct cable type. See Appendix B, "Connector and Cable Specifications" for more information.
- Check for loose connections. Sometimes a cable appears to be seated, but is not. Disconnect the cable and then reconnect it.

PoE Connections

When a powered device is connected to PoE port, but no power is received, you should:

- Use the Mode button to show the PoE status for all ports. See Table 1-9 and Table 1-10 for a description of the LEDs and their meanings.
- Check the port status by using the **show interfaces** privileged EXEC command to check the port error-disabled, disabled, or shutdown status. Re-enable the port if necessary.
- Verify that the power supply installed in the switch meets the power requirements of your connected devices. See the "Power-Supply Modules" section on page 1-15 for more information.
- Check the cable type. Many legacy powered devices, including older Cisco IP phones and access points that do not fully support IEEE 802.3af, might not support PoE when connected to the switch by a crossover cable. Replace the crossover cable with a straight-through cable.

Caution PoE faults are caused when noncompliant cabling or powered devices are connected to a PoE port. Only standard-compliant cabling can be used to connect Cisco pre-standard IP phones and wireless access points or IEEE 802.3af-compliant devices to PoE ports. (You must remove a cable or device that causes a PoE fault from the network.)

Transceiver Issues

Use only Cisco X2 transceiver modules and SFP modules on the switch. Each Cisco module has an internal serial EEPROM that is encoded with security information. This encoding provides a way for Cisco to identify and validate that the module meets the requirements for the switch. Check these items:

- Bad or wrong X2 transceiver, Cisco TwinGig Converter module, or SFP module. Exchange suspect module with known good module. Verify that the module is supported on this platform. (The switch release notes on Cisco.com list the X2 and SFP modules that the switch supports.)
- Use the **show interfaces** privileged EXEC command to check the port or module error-disabled, disabled, or shutdown status. Re-enable the port if needed.
- Make sure that all fiber connections are properly cleaned and securely connected.
- For CX4 module connections, make sure that cable routing does not violate the minimum allowed cable bend radius. See the module documentation for specific cabling requirements.
- For LX4 modules, a mode conditioning patch is recommended for MMF applications.

Port and Interface Settings

An obvious but sometimes overlooked cause of port connectivity failure is a disabled port. Verify that the port or interface is not disabled or powered down for some reason. If a port or interface is manually shut down on one side of the link or the other side, the link does not come up until you re-enable the

port. Use the **show interfaces** privileged EXEC command to check the port or interface error-disabled, disabled, or shutdown status on both sides of the connection. If needed, re-enable the port or the interface.

Ping End Device

Check the end device by pinging from the directly connected switch first, and then work your way back port by port, interface by interface, trunk by trunk, until you find the source of the connectivity issue. Make sure that each switch can see the end device MAC address in its Content-Addressable Memory (CAM) table.

Spanning Tree Loops

Spanning Tree Protocol (STP) loops can cause serious performance issues that look like port or interface problems. In this situation, the switch bandwidth is used over and over again by the same frames, leaving little room for legitimate traffic.

Loops can be caused by a unidirectional link. A unidirectional link occurs whenever the traffic sent by the switch is received by its neighbor, but the traffic from the neighbor is not received by the switch. A broken fiber-optic cable, other cabling, or a port issue could cause this one-way communication.

You can enable UniDirectional Link Detection (UDLD) on the switch to help identify difficult-to-find unidirectional link problems. UDLD supports two modes of operation: normal (the default) and aggressive. In normal mode, UDLD detects unidirectional links due to misconnected interfaces on fiber-optic connections. In aggressive mode, UDLD also detects unidirectional links due to one-way traffic on fiber-optic and twisted-pair links and due to misconnected interfaces on fiber-optic links. For information about enabling UDLD on the switch, see the “Understanding UDLD” section in the software configuration guide for this release.

Check Switch Performance

Review this section when troubleshooting switch performance problems.

Speed, Duplex, and Autonegotiation

If the port statistics show a large amount of alignment errors, frame check sequence (FCS), or late-collisions errors, this might indicate a speed or duplex mismatch.

A common issue with speed and duplex is when the duplex settings are mismatched between two switches, between a switch and a router, or between the switch and a workstation or server. This can happen when manually setting the speed and duplex, or from autonegotiation issues between the two devices. A mismatch occurs under these circumstances:

- A manually set speed or duplex parameter is different from the manually set speed or duplex parameter on the connected port.
- A port is set to autonegotiate, and the connected port is set to full duplex with no autonegotiation.

To maximize switch performance and ensure a link, follow one of these guidelines when changing the settings for duplex and speed:

- Let both ports autonegotiate both speed and duplex.
- Manually set the speed and duplex parameters for the ports on both ends of the connection.

- If a remote device does not autonegotiate, configure the duplex settings on the two ports to match. The speed parameter can adjust itself even if the connected port does not autonegotiate.

Autonegotiation and NIC Cards

Problems sometimes occur between the switch and third-party network interface cards (NICs). By default, the switch ports and interfaces are set to autonegotiate. It is common for devices like laptops or other devices to be set to autonegotiate as well, yet sometimes autonegotation issues occur.

To troubleshoot autonegotiation problems try manually setting both sides of the connection. If this does not solve the problem, there could be a problem with the firmware or software on your NIC card. You can resolve this by upgrading the NIC card driver to the latest version available from the manufacture.

Cabling Distance

If the port statistics show excessive FCS, late-collision, or alignment errors, verify that the cable distance from the switch to the connected device meets the recommended guidelines. See the "Cable and Adapter Specifications" section on page B-5 for cabling guidelines.

How to Clear the Switch IP Address and Configuration

If you have configured a new switch with a wrong IP address, or if all of the switch LEDs start blinking when you are trying to enter Express Setup mode, you can clear the IP address that is configured on the switch.

Note This procedure clears the IP address and all configuration information stored on the switch. Do not follow this procedure unless you want to completely reconfigure the switch.

Follow these steps to return your switch to the factory default settings:

1. Press and hold the Mode button (Figure 1-1 on page 1-3).

   The switch LEDs begin blinking after about 2 seconds. If the switch is not configured, the LEDs above the mode button turn green. You can omit this step and run Express Setup to configure the switch.

2. Continue holding down the Mode button. The LEDs stop blinking after an additional 8 seconds, and then the switch reboots.

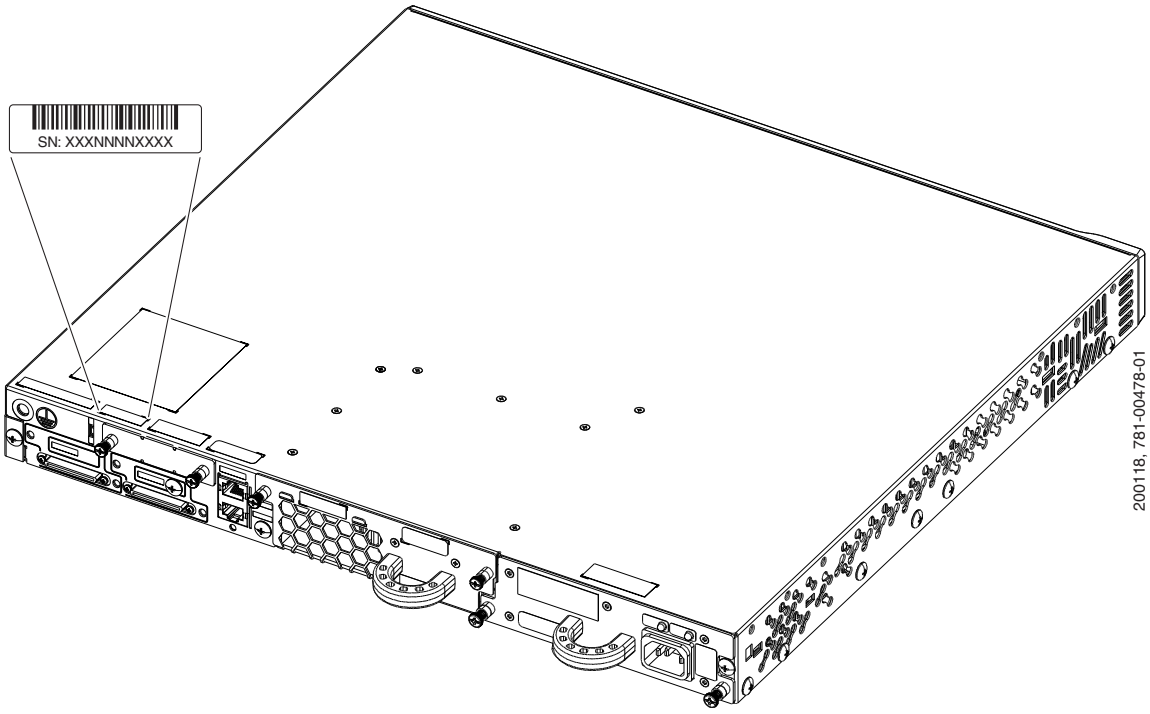
The switch now behaves like an unconfigured switch. You can configure the switch by using Express Setup as described in the switch getting started guide that is included with the switch.

You can also configure the switch by using the CLI setup procedure described in the Configuring the Switch with the CLI-Based Setup Program appendix.

Finding the Switch Serial Number

If you contact Cisco Technical Assistance, you need to know the serial number of your switch. See Figure 4-1 to find the serial number on your switch. You can also use the **show version** privileged EXEC command to get the switch serial number.

Figure 4-1 Switch Serial Number Location



How to Replace a Failed Stack Member

If you need to replace a failed stack member, you can hot swap or replace the switch by following this procedure (only Catalyst 3750-E switches):

1. Get a replacement switch that has the same model number as the failed switch.
2. Power down the failed switch.
3. Make sure the replacement switch is powered off, and then connect the replacement switch to the stack.

   If you had manually set the member numbers for any members in the stack, you need to manually assign the replacement switch with the same member number as the failed switch. To manually assign the member number, see the switch software configuration guide.
4. Make the same Gigabit Ethernet connections on the replacement switch that were on the failed switch.

5. Reinstall any modules and cable connections.
6. Power on the replacement switch.

The replacement switch will have the same configuration for all the interfaces as the failed switch and will function the same as the failed switch.

APPENDIX A

Technical Specifications

This appendix lists the Catalyst 3750-E and Catalyst 3560-E switch technical specifications.

Table A-1 shows the switch environmental and physical specifications.

Table A-1 Switch Environmental and Physical Specifications

Environmental Ranges	
Operating temperature	32 to 113° F (0 to 45° C)
Storage temperature	–13 to 158° F (–25 to 70° C)
Relative humidity	10 to 85% (noncondensing)
Operating altitude	Up to 10,000 ft (3049 m)
Storage altitude	Up to 15,000 ft (4573 m), NEBS up to 13,000 ft (4000 m)
Physical Specifications	
Weight	Catalyst 3750E-24TD and Catalyst 3560E-24TD: 17.9 lb (8.1 kg) Catalyst 3750E-48TD and Catalyst 3560E-48TD: 18.8 lb (8.6 kg) Catalyst 3750E-24PD and Catalyst 3560E-24PD: 18.3 lb (8.3 kg) Catalyst 3750E-48PD and Catalyst 3560E-48PD: 19.2 lb (8.75 kg)[1] Catalyst 3560E-12D 23.5 lb (10.7 kg) Catalyst 3560E-12SD 15.5 lb (7 kg)
Physical Specifications	
Dimensions (H x D x W)	24- and 48-port Catalyst 3750-E and 3560-E switches: 1.75 x 18.1 x 17.5 in. (4.45 x 46 x 44.5 cm)[2] Catalyst 3560E-12D: 1.75 x 19.5 x 17.5 in. (4.45 x 49.5 x 44.5 cm) Catalyst 3560E-12SD: 1.75 x 15 x 17.5 in. (4.45 x 38.1 x 44.5 cm)

1. With C3K-PWR-1150WAC power supply, weight = 20.9 lb (9.5 kg).
2. With C3K-PWR-1150WAC power supply, depth = 21.7 in (55.2 cm).

Table A-2 shows the power specifications for AC-powered 24- and 48-port switches.

Table A-2 Power Specifications for AC-Powered 24- and 48-Port Switches

Power Specifications	
Maximum output power	C3K-PWR-1150WAC: 1150 W C3K-PWR-750WAC: 750 W C3K-PWR-265WAC: 265 W
Input voltage range and frequency	C3K-PWR-750WAC: 750 W, C3K-PWR-265WAC: 265 W, 100 to 240 VAC (autoranging), 47 to 63 Hz C3K-PWR-1150WAC: 1150 W: 115 to 240 VAC (autoranging) 47 to 63 Hz
Input current	C3K-PWR-1150WAC:12–6 A C3K-PWR-750WAC: 10–5 A C3K-PWR-265WAC: 5–2.5 A
Output ratings	C3K-PWR-1150WAC: 12 V@25 A, –52 V @ 16.4 A C3K-PWR-750WAC: 12 V@25 A, –52 V @ 8.75 A C3K-PWR-265WAC: 12 V@22 A
Total input BTU[1]	C3K-PWR-1150WAC: 4778 Btus per hour, 1386 W C3K-PWR-750WAC: 3043 Btus per hour, 882 W C3K-PWR-265WAC: 1142 Btus per hour, 331 W
Total output BTU[1]	C3K-PWR-1150WAC: 3939 Btus per hour, 1150 W C3K-PWR-750WAC: 2568 Btus per hour, 765 W C3K-PWR-265WAC: 907 Btus per hour, 265 W
DC input voltage for RPS 2300	⎓+12 V⎓@25 A, 52 V@16.4 A

1. The Total input and Total output BTU ratings refer to input power into the power supply and output power from the power supply that is input into the switch.

Table A-3 shows the power specifications for AC-powered Catalyst 3560E-12D and 3560E-12SD switches.

Table A-3 Power Specifications for AC-Powered Catalyst 3560E-12D and 3560E-12SD Switches

Power Specifications	
Maximum output power	C3K-PWR-300WAC: 300 W
Input voltage range and frequency	C3K-PWR-300WAC: 85 to 265 VAC (autoranging), 47 to 63 Hz
Input current	C3K-PWR-300WAC: 5–2 A
Output ratings	C3K-PWR-300WAC: 12 V @25 A
Total input BTU[1]	C3K-PWR-300WAC: 1034 Btus per hour, 300 W

1. The Total input and Total output BTU ratings refer to input power into the power supply and output power from the power supply that is input into the switch.

Table A-4 shows the power specifications for DC-powered 24- and 48-port switches.

Table A-4 Power Specifications for DC-Powered 24- and 48-Port Switches

Power Specifications	
Maximum output power	C3K-PWR-265WDC: 265 W
Input current	C3K-PWR-265WDC: 12 A
DC input voltage	C3K-PWR-265WDC: –36 to –72 VDC
Output ratings	C3K-PWR-265WDC: 12 V@22 A
Voltage range domestic	C3K-PWR-265WDC: –40.5 VDC (minimum), –48 VDC (nominal), –56 VDC (maximum)
Voltage range international	C3K-PWR-265WDC: –55 VDC (minimum), –60 VDC (nominal), –72 VDC (maximum)
Total input BTU[1]	C3K-PWR-265WDC: 1305 Btus per hour, 379 W
Total output BTU[1]	C3K-PWR-265WDC: 907 Btus per hour, 265 W
Wire gauge for ground connection	C3K-PWR-265WDC: 12 AWG or 6 AWG
Branch circuit protection	C3K-PWR-265WDC: 15 A

1. The Total input and Total output BTU ratings refer to input power into the power supply and output power from the power supply that is input into the switch.

Table A-5 shows the power specifications for DC-powered Catalyst 3560E-12D and 3560E-12SD switches.

Table A-5 Power Specifications for DC-Powered Catalyst 3560E-12D and 3560E-12SD Switches

Power Specifications	
Maximum output power	C3K-PWR-300WDC: 300 W
Input current	C3K-PWR-300WDC: 10–6 A
DC input voltage	C3K-PWR-300WDC: –40.5 to –72 VDC
Output ratings	C3K-PWR-300WDC: 12 V@ 25 A
Voltage range domestic	C3K-PWR-300WDC: –40.5 VDC (minimum), –48 VDC (nominal), –56 VDC (maximum)
Voltage range international	C3K-PWR-300WDC: –55 VDC (minimum), –60 VDC (nominal), –72 VDC (maximum)
Total input BTU[1]	C3K-PWR-300WDC: 1034 Btus per hour, 300 W
Wire gauge for ground connection	C3K-PWR-300WDC: 12 AWG or 6 AWG
Branch circuit protection	C3K-PWR-300WDC: 15 A

1. The Total input and Total output BTU ratings refer to input power into the power supply and output power from the power supply that is input into the switch.

APPENDIX B

Connector and Cable Specifications

This appendix describes the cables and adapters that you use to connect the Catalyst 3750-E and Catalyst 3560-E switches to other devices. This appendix includes these sections:

- "Connector Specifications" section on page B-1
- "Cable and Adapter Specifications" section on page B-5

Connector Specifications

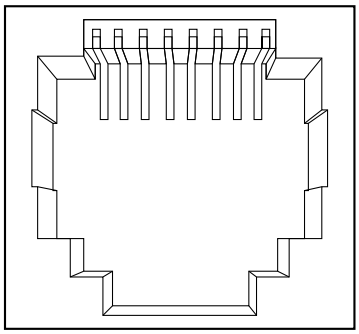
These sections describe the connectors used with the switches:

- 10/100/1000 Ports, page B-2
- 10-Gigabit Ethernet Module Interfaces, page B-2
- SFP Modules, page B-3
- 10/100 Ethernet Management Port, page B-4
- Console Port, page B-4

10/100/1000 Ports

The 10/100/1000 Ethernet ports on switches use standard RJ-45 connectors and Ethernet pinouts. Figure B-1 shows the pinouts.

Figure B-1 10/100/1000 Port Pinouts

Pin	Label	1 2 3 4 5 6 7 8
1	TP0+	
2	TP0-	
3	TP1+	
4	TP2+	
5	TP2-	
6	TP1-	
7	TP3+	
8	TP3-	

10-Gigabit Ethernet Module Interfaces

The 10-Gigabit Ethernet optical modules use SC connectors or Infiniband 4x connectors, as shown in Figure B-2 and Figure B-3.

Figure B-2 10-Gigabit Ethernet Optical Module SC Connector

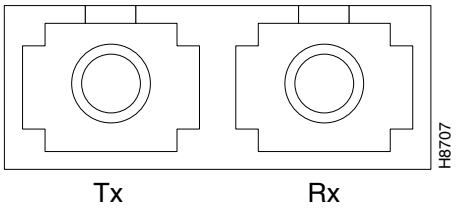
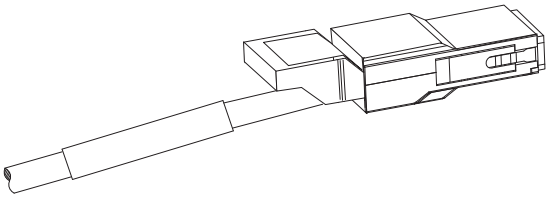


Figure B-3 10-Gigabit Ethernet Infiniband 4x Connector



SFP Modules

Figure B-4, Figure B-5, and Figure B-6 show the SFP module connectors.

The Catalyst 3560-E switch supports the SFP module patch cable, a 0.5-meter, copper, passive cable with SFP module connectors at each end (Figure B-7). The patch cable can connect two Catalyst 3560-E switches in a cascaded configuration.

Figure B-4 Duplex LC Cable Connector

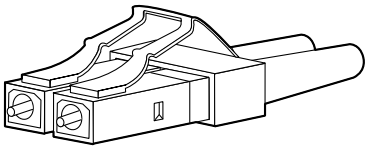


Figure B-5 Simplex LC Cable Connector

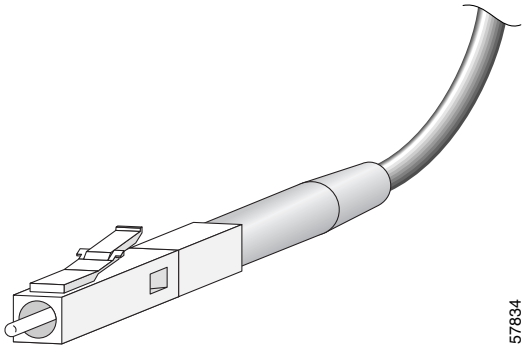


Figure B-6 Copper SFP Module RJ-45 Connector

Pin	Label	1 2 3 4 5 6 7 8
1	TP0+	
2	TP0-	
3	TP1+	
4	TP2+	
5	TP2-	
6	TP1-	
7	TP3+	
8	TP3-	

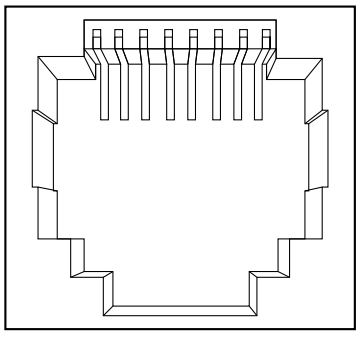
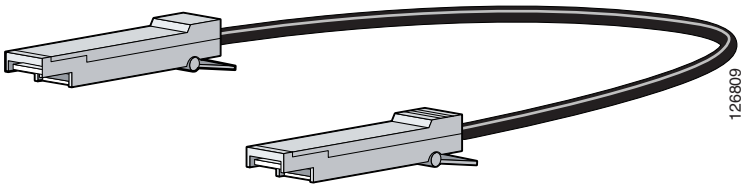


Figure B-7 SFP Module Patch Cable (Only Catalyst 3560-E Switches)

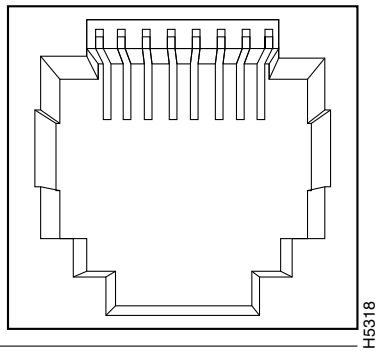


10/100 Ethernet Management Port

The 10/100 Ethernet management port uses standard RJ-45 connectors with Ethernet pinouts. Figure B-8 shows the pinouts.

Figure B-8 10/100 Port Pinouts

Pin	Label
1	RD+
2	RD-
3	TD+
4	NC
5	NC
6	TD-
7	NC
8	NC



Console Port

The console port uses an 8-pin RJ-45 connector, which is described in Table B-4 and Table B-5. The supplied RJ-45-to-DB-9 adapter cable is used to connect the console port of the switch to a console PC. You need to provide a RJ-45-to-DB-25 female DTE adapter if you want to connect the switch console port to a terminal. You can order a kit (part number ACS-DSBUASYN=) containing that adapter from Cisco. For console port and adapter pinout information, see Table B-4 and Table B-5.

Cable and Adapter Specifications

These sections describe the cables and adapters used with Catalyst 3750-E and Catalyst 3560-E switches:

- 10-Gigabit Ethernet X2 Transceiver Module Cable Specifications, page B-5
- SFP Module Cable Specifications, page B-6
- Four Twisted-Pair Cable Pinouts, page B-7
- Two Twisted-Pair Cable Pinouts, page B-8
- Identifying a Crossover Cable, page B-9
- Console Port Adapter Pinouts, page B-9

10-Gigabit Ethernet X2 Transceiver Module Cable Specifications

Table B-1 lists the port cabling specifications for the 10-Gigabit Ethernet X2 transceiver modules. Each port must match the wave-length specifications on the other end of the cable, and for reliable communications, the cable must not exceed the stipulated cable length.

Table B-1 X2 Transceiver Port Cabling Specifications

X2 Product Number	Wavelength (nm)	Cable Type	Core Size (microns)	Modal Bandwidth (MHz/km)	Maximum Cabling Distance
X2-10GB-SR	850	MMF	62.5 62.5 50.0 50.0 50.0	160 200 400 500 2000	85 feet (26 m) 108 feet (33 m) 217 feet (66 m) 269 feet (82 m) 984 feet (300 m)
X2-10GB-LR	1310	SMF	G.652 fiber	—	32,810 feet (10 km)
X2-10GB-ER	1550	SMF	G.652 fiber	—	24.84 miles (40 km)
X2-10GB-LX4	1310	MMF[1]	62.5 50.0 50.0	500 400 500	984 feet (300 m) 787 feet (240 m) 984 feet (300 m)
X2-10GB-CX4	—	InfiniBand (copper)	—	—	49 feet (15 m)

1. Mode conditioning patch cord is recommended for MMF applications.

Table B-2 lists the transceiver optical transmit and receive specifications.

Table B-2 X2 Transceiver Optical Transmit and Receive Specifications

X2 Product Number	Transceiver Type	Transmit Power (dBm)	Receive Power (dBm)	Transmit and Receive Wavelength (nm)
X2-10GB-SR	10GBASE-SR, 850-nm MMF	–1[1] (Max) –7.3 (Min)	–1.0 (Max) –9.9 (Min)	840 to 860
X2-10GB-LR	10GBASE-LR, 1310-nm SMF	0.5 (Max) –8.2 (Min)	0.5 (Max) –14.4 (Min)	1260 to 1355
X2-10GB-ER	10GBASE-ER, 1550-nm SMF	4.0 (Max) –4.7 (Min)	–1.0 (Max) –15.8 (Min)	1530 to 1565
X2-10GB-LX4	10GBASE-LX4 WWWDM 1300-nm MMF	–0.5 per lane (Max) —	–0.5 (Max) –14.4 per lane	Four lanes; overall range: 1269 to 1356

1. The launch power shall be the lesser of the Class 1 safety limit or the maximum receive power. Class 1 laser requirements are defined by IEC 60825-1: 2001.

SFP Module Cable Specifications

Table B-3 lists the cable specifications for 100BASE-FX, 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, and CWDM fiber-optic SFP module connections. Each port must match the wave-length specifications on the other end of the cable, and the cable must not exceed the stipulated cable length. Copper 1000BASE-T SFP transceivers use standard four twisted-pair, Category 5 cable at lengths up to 328 feet (100 meters).

Table B-3 Fiber-Optic SFP Module Port Cabling Specifications

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
100BASE-FX	Min.: 1270 Typical: 1300 Max.: 1380	MMF	50/125	500	6,562 feet (2 km)
1000BASE-BX	1490/1310	SMF	G.652	—	32,810 feet (10 km)
1000BASE-LX/LH	1300	MMF[1] SMF	62.5 50 50 G.652[2]	500 400 500 —	1804 feet (550 m) 1804 feet (550 m) 1804 feet (550 m) 32,810 feet (10 km)
1000BASE-SX	850	MMF	62.5 62.5 50 50	160 200 400 500	722 feet (220 m) 902 feet (275 m) 1640 feet (500 m) 1804 feet (550 m)
1000BASE-ZX	1550	SMF	G.652	—	43.4 to 62 miles (70 to 100 km)[3]

Table B-3 Fiber-Optic SFP Module Port Cabling Specifications (continued)

SFP Module	Wavelength (nanometers)	Fiber Type	Core Size (micron)	Modal Bandwidth (MHz/km)	Cable Distance
CWDM	1470, 1510, 1530, 1550, 1570, 1590, 1610	SMF	G.652	—	43.4 to 62 miles (70 to 100 km)

1. A mode-conditioning patch cord is required. Using an ordinary patch cord with MMF, 1000BASE-LX/LH SFP modules, and a short link distance can cause transceiver saturation, resulting in an elevated bit error rate (BER). When using the LX/LH SFP module with 62.5-micron diameter MMF, you must also install a mode-conditioning patch cord between the SFP module and the MMF cable on both the sending and receiving ends of the link. The mode-conditioning patch cord is required for link distances greater than 984 feet (300 m).
2. ITU-T G.652 SMF as specified by the IEEE 802.3a standard.
3. 1000BASE-ZX SFP modules can send data up to 62 miles (100 km) by using dispersion-shifted SMF or low-attenuation SMF; the distance depends on the fiber quality, the number of splices, and the connectors.

Four Twisted-Pair Cable Pinouts

Figure B-9 and Figure B-10 show the schematics of four twisted-pair cables.

Figure B-9 Four Twisted-Pair Straight-Through Cable Schematic

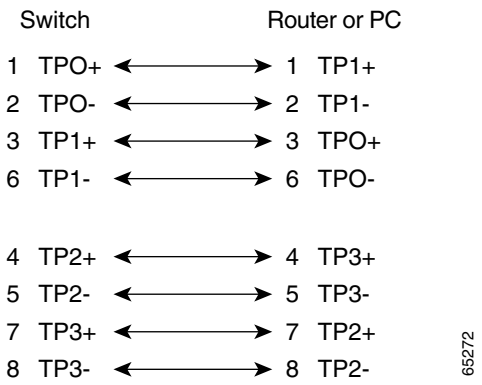


Figure B-10 Four Twisted-Pair Crossover Cable Schematic

Two Twisted-Pair Cable Pinouts

Figure B-11 and Figure B-12 show the schematics of two twisted-pair cables.

Figure B-11 Two Twisted-Pair Straight-Through Cable Schematic

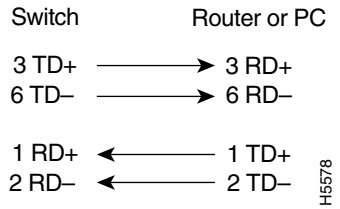
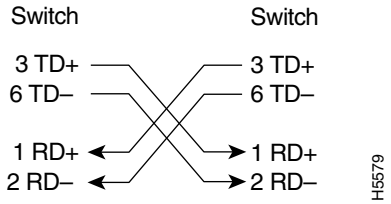


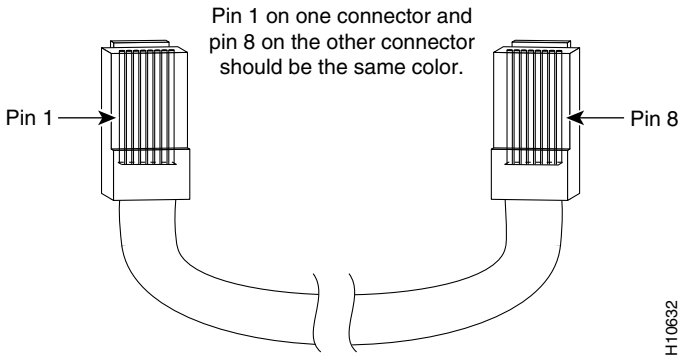
Figure B-12 Two Twisted-Pair Crossover Cable Schematic



Identifying a Crossover Cable

To identify a crossover cable, compare the two modular ends of the cable. Hold the cable ends side-by-side, with the tab at the back. The wire connected to the pin on the outside of the left plug should be the same color as the wire connected to the pin on the outside of the right plug. (See Figure B-13.)

Figure B-13 Identifying a Crossover Cable



Console Port Adapter Pinouts

Table B-4 lists the pinouts for the console port, the RJ-45-to-DB-9 adapter cable, and the console device.

Table B-4 Console Port Signaling Using a DB-9 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-9 Terminal Adapter	Console Device
Signal	**DB-9 Pin**	**Signal**
RTS	8	CTS
DTR	6	DSR
TxD	2	RxD
GND	5	GND
GND	5	GND
RxD	3	TxD
DSR	4	DTR
CTS	7	RTS

Table B-5 lists the pinouts for the console port, RJ-45-to-DB-25 female DTE adapter, and the console device.

Note The RJ-45-to-DB-25 female DTE adapter is not supplied with the switch. You can order a kit (part number ACS-DSBUASYN=) containing this adapter from Cisco.

Table B-5 Console Port Signaling Using a DB-25 Adapter

Switch Console Port (DTE)	RJ-45-to-DB-25 Terminal Adapter	Console Device
Signal	**DB-25 Pin**	**Signal**
RTS	5	CTS
DTR	6	DSR
TxD	3	RxD
GND	7	GND
GND	7	GND
RxD	2	TxD
DSR	20	DTR
CTS	4	RTS

APPENDIX C

Configuring the Switch with the CLI-Based Setup Program

This appendix provides a CLI-based setup procedure for a Catalyst 3750-E and Catalyst 3560-E standalone switch or a switch stack. Before connecting the switch to a power source, review the safety warnings in Chapter 2, "Switch Installation."

Accessing the CLI

For an unconfigured switch, you can access the CLI through Express Setup or through the console port.

Accessing the CLI Through Express Setup

You can access the CLI on an unconfigured switch by placing the switch in Express Setup mode and then connecting a switch Ethernet port or the Ethernet management port to the Ethernet port of your PC or workstation. To put the switch into Express Setup mode, follow the steps described in the getting started guide for powering on the switch and using Express Setup.

When the switch is in Express Setup mode, open a Telnet session to the switch by entering the IP address *10.0.0.1*. Enter the **setup** user EXEC command. Enter the information described in the "Entering the Initial Configuration Information" section on page C-2.

After you have entered the configuration information for the switch, save it to flash memory by using the **write memory** privileged EXEC command.

Note While in Express Setup mode, the IP address 10.0.0.1 remains active on the switch until you enter the **write memory** command. You lose the Telnet connection after entering the **write memory** command.

For more information about using the CLI, see the command reference for this release.

Accessing the CLI Through the Console Port

You can access the CLI on a configured or unconfigured switch by connecting the console port of the switch to your PC or workstation and accessing the switch through a terminal emulation program.

Note For Catalyst 3750-E switches, if you have stacked your switches, connect to the 10/100 Ethernet management port or console port of one of the switches in the stack. The initial configuration for the entire stack can be performed on any switch in the stack.

Connecting to the Console Port

You can use the console port on the switch rear panel to perform the initial configuration as an alternative to using Express Setup.

Follow these steps:

1. Using the supplied RJ-45-to-DB-9 adapter cable, insert the RJ-45 connector into the console port on the switch rear panel (Figure 1-7) and to the PC or terminal port.
1. Start the terminal-emulation program on the PC or terminal. The terminal-emulation software, frequently a PC application such as Hyperterminal or ProcommPlus, makes communication between the switch and your PC or terminal possible.
2. Start a terminal-emulation session.
3. Configure the baud rate and character format of the PC or terminal to match these console port default characteristics:
   - 9600 baud
   - 8 data bits
   - 1 stop bit
   - No parity
   - None (flow control)
4. Power on the switch as described in the switch getting started guide and in the "Installing an AC-Power Supply" section on page 3-3.
5. The PC or terminal displays the bootloader sequence. Press **Enter** to display the setup prompt. Follow the steps described in the "Entering the Initial Configuration Information" section on page C-2.

Entering the Initial Configuration Information

To set up the switch, you need to complete the setup program, which runs automatically after the switch is powered on. You must assign an IP address and other configuration information necessary for the switch to communicate with the local routers and the Internet. This information is also required if you plan to use the device manager or Cisco Network Assistant to configure and manage the switch.

IP Settings

You will need this information from your network administrator before you complete the setup program:

- Switch IP address
- Subnet mask (IP netmask)

- Default gateway (router)
- Enable secret password
- Enable password
- Telnet password

Completing the Setup Program

If your switches are stacked and there are multiple console connections to individual switches in the stack, the initial setup dialog appears at the console where you first press **Enter**.

Follow these steps to complete the setup program and to create an initial configuration for the switch:

Step 1 Enter **Yes** at the following two prompts.

```
Would you like to enter the initial configuration dialog? [yes/no]: yes

At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system.

Would you like to enter basic management setup? [yes/no]: yes
```

Step 2 Enter a host name for the switch, and press **Return**.

On a command switch, the host name is limited to 28 characters; on a member switch to 31 characters. Do not use *-n*, where n is a number, as the last character in a host name for any switch.

```
Enter host name [Switch]: host_name
```

Step 3 Enter an enable secret password, and press **Return**.

The password can be from 1 to 25 alphanumeric characters, can start with a number, is case sensitive, allows spaces, but ignores leading spaces. The secret password is encrypted, and the enable password is in plain text.

```
Enter enable secret: secret_password
```

Step 4 Enter an enable password, and press **Return**.

```
Enter enable password: enable_password
```

Step 5 Enter a virtual terminal (Telnet) password, and press **Return**.

The password can be from 1 to 25 alphanumeric characters, is case sensitive, allows spaces, but ignores leading spaces.

```
Enter virtual terminal password: terminal-password
```

Step 6 (Optional) Configure Simple Network Management Protocol (SNMP) by responding to the prompts. You can also configure SNMP later through the CLI, the device manager, or the Network Assistant application. To configure SNMP later, enter **no**.

```
Configure SNMP Network Management? [no]: no
```

Step 7 Enter the interface name (physical interface or VLAN name) of the interface that connects to the management network, and press **Return**. For this release, always use **vlan1** as that interface.

```
Enter interface name used to connect to the
management network from the above interface summary: vlan1
```

Step 8 Configure the interface by entering the switch IP address and subnet mask and pressing **Return**. The IP address and subnet masks shown are examples.

```
Configuring interface vlan1:
Configure IP on this interface? [yes]: yes
IP address for this interface: 10.4.120.106
Subnet mask for this interface [255.0.0.0]: 255.0.0.0
```

Step 9 Enter **Y** to configure the switch as the cluster command switch. Enter **N** to configure it as a member switch or as a standalone switch.

If you enter **N**, the switch appears as a candidate switch in the Network Assistant GUI. You can configure the switch as a command switch later through the CLI, the device manager, or the Network Assistant application. To configure it later, enter **no**.

```
Would you like to enable as a cluster command switch? [yes/no]: no
```

You have now completed the initial configuration of the switch, and the switch displays its initial configuration. This is an example of output that appears:

```
The following configuration command script was created:
hostname switch1
enable secret 5 $1$Ulq8$DlA/OiaEbl90WcBPd9cOn1
enable password enable_password
line vty 0 15
password terminal-password
no snmp-server
!
no ip routing

!
interface Vlan1
no shutdown
ip address 10.4.120.106 255.0.0.0
!
interface GigabitEthernet1/0/1
!
interface GigabitEthernet1/0/2

interface GigabitEthernet1/0/3
!
...<output abbreviated>
!


interface GigabitEthernet1/0/23
!
end
```

Step 10 These choices appear:

```
[0] Go to the IOS command prompt without saving this config.

[1] Return back to the setup without saving this config.

[2] Save this configuration to nvram and exit.
```

If you want to save the configuration and use it the next time the switch reboots, save it in nonvolatile RAM (NVRAM) by selecting option 2.

```
Enter your selection [2]:2
```

Make your selection, and press **Return**.

After you complete the setup program, the switch can run the default configuration that you created. If you want to change this configuration or want to perform other management tasks, use Cisco Network Assistant, the Cluster Management Suite (CMS), or another management tool for further configuration.

INDEX

Numerics

10/100/1000 ports
- cable lengths 1-4, 2-26
- connecting to 2-26
- described 1-4
- numbering 1-3
- pinouts B-2
- recommended cables 2-26

10/100 Ethernet management port 1-20

10-Gigabit Ethernet module slots
- cable lengths B-5
- connecting devices 2-19
- described 1-5
- numbering 1-3
- recommended cables B-5

19- and 24-inch racks 2-14

A

AC power
- connecting to 3-3
- power-supply module described 1-15
- power supply module installation 3-3
- specifications A-2

adapter pinouts, terminal
- RJ-45-to-DB-25 B-10
- RJ-45-to-DB-9 B-9

airflow patterns 1-18, 1-19

altitude, operating and storage A-1

autonegotiation
- default setting 2-26
- troubleshooting 4-4

B

bodily injury protection warning 2-3, 2-10

brackets
- See mounting brackets

C

cable guide, attaching 2-14

cable lengths B-5

cables
- crossover
  - four twisted-pair pinout B-8
  - identifying B-9
  - two twisted-pair pinout B-8
- patch cable B-3
- recommended 2-26
- SFP module B-6
- StackWise
  - cable numbers 1-14
  - connecting to 2-18
- straight-through
  - four twisted-pair pinout B-7
  - two twisted-pair pinout B-8
- X2 transceiver module B-5

Cisco IOS command-line interface 1-21

Cisco IP Phones, connecting to 2-26 to 2-27

Cisco Network Assistant 1-20

Cisco Power Calculator 2-27

Cisco TwinGig Converter Module
- described 1-5
- installation 2-19

CiscoView 1-21

Class 1 laser warning 2-3
CLI 1-21
accessing by using Express Setup C-1
accessing through console port C-1
code compliance warning 2-4
command-line interface
See CLI
connection procedures 2-19 to 2-27, 3-3 to 3-10
connectors and cables B-1 to B-10
console port
connecting to C-2
connectors and cables B-4
described 1-20
crossover cable
See cables

D

DC circuit warning 2-3
DC power
power-supply module described 1-15
specifications A-3
DC power warning 3-4
device manager
described 1-21
to configure switch 2-28
diagnosing problems 4-1
dimensions A-1
duplex
default setting 2-26
LED 1-9
troubleshooting 4-4

E

electrical noise, avoiding 2-5
electromagnetic safety 2-4
Ethernet and fiber cable troubleshooting 4-2
Ethernet management port
described 1-20
LED POST results 4-1
LEDs 1-20
Express Setup
accessing CLI by using C-1
for initial switch configuration 2-17
using to clear switch IP address 4-5

F

fan module
airflow patterns 1-18, 1-19
described 1-17
installing 3-10
front panel
10/100/1000 Ethernet ports 1-4
10-Gigabit Ethernet module slots 1-5
clearance 2-5
described 1-2 to 1-12
LEDs 1-6 to 1-12
PoE ports 1-4

G

ground connection 3-5
ground connection warning 2-3, 3-5

H

HP OpenView 1-21
humidity, relative A-1

I

installation
- assigning the IP address 2-1, C-2
- Cisco TwinGig Converter Modules 2-19
- rack-mounting 2-10 to 2-14
- SFP modules 2-22 to 2-25
- site requirements 2-5
- starting the terminal emulation software C-2
- table or shelf-mounting 2-17
- X2 transceiver modules 2-19
- See also procedures

J

jewelry removal warning 2-2

L

LEDs
- color meanings 1-9
- duplex 1-9
- fan 1-9
- front panel 1-6 to 1-12
- interpreting 1-9
- master 1-8
- PoE 1-9
- port 1-9 to 1-12
- port mode 1-9 to 1-10
- POST results 4-1
- power supply 1-8
- RPS 1-8
- speed 1-9
- stack 1-12
- STATUS 1-9
- system 1-7
- troubleshooting with 4-1 to 4-2

lightning activity warning 2-2, 3-2
link status troubleshooting 4-2
local and national electrical codes compliance 2-4

M

mode button 1-6
mounting, table or shelf 2-17
mounting brackets
- rack-mount 2-14
- table- or shelf-mounting 2-17
- wall-mount 2-15

N

NEBS standard for electromagnetic safety 2-4
Network Assistant 2-28
Network Equipment Building Systems
- See NEBS

noise, electrical 2-5

O

outside connections warning 2-4
overheating warning 2-2

P

pinouts
- 10/100/1000 ports B-2
- adapters B-9 to B-10
- console port B-10
- crossover cable B-9
- crossover cables
  - four twisted-pair B-8
  - two twisted-pair B-8
- RJ-45-to-DB-25 terminal adapter B-10
- RJ-45-to-DB-9 terminal adapter B-9

SFP module ports B-3
straight-through cables
four twisted-pair B-7
two twisted-pair B-8
PoE
faults caution 1-11
LED 1-9, 1-11
port connections 2-26
ports described 1-4
power planning tool 2-27
shock hazard warning 2-4, 2-27
troubleshooting 4-3
port and interface troubleshooting 4-3
port LEDs 1-9 to 1-12
port modes
changing 1-6
LEDs 1-9
See also mode button
ports
10/100/1000
connecting to 2-26
described 1-4
pinouts B-2
recommended cables 2-26
POST
LEDs 4-1
running at power on 4-1
power connection warning 2-3
Power over Ethernet
See PoE
power specifications A-2
power-supply modules
described 1-15
installation 3-1
procedures
connection 2-19 to 2-27, 3-3 to 3-10
installation 2-10 to 2-17
product disposal warning 2-4

R

rack-mounting 2-10 to 2-14
rear panel
clearance 2-5
console port 1-20
described 1-13 to 1-20
Ethernet management port 1-20
fan module 1-17
power-supply module 1-15
RPS connector 1-19
StackWise ports 1-14
redundant power supply
See RPS
restricted access area warning 2-3
RJ-45 connector, console port B-4
RJ-45 console port 1-13
RPS
connector 1-19
connector cover warning 2-2
described 1-19
LED 1-8

S

safety 2-1
serial number location 4-6
servicing equipment warning 2-3
SFP modules
bale-clasp latch removal 2-25
cables B-6
connectors B-3
described 1-5
installation 2-22 to 2-25
patch cable B-3
supported 1-5
SFP module slot numbering 1-4
shelf-mounting 2-17
shielding Ethernet cables warning 2-2

Simple Network Management Protocol
See SNMP
SNMP network management platforms 1-21
software switch management 1-20
specifications A-1
speed
default setting 2-26
troubleshooting 4-4
stacking equipment warning 2-2
stacking powering considerations 2-9
StackWise ports 1-14
straight-through cable pinout
four twisted-pair B-7
two twisted-pair B-8
SunNet Manager 1-21
switch models 1-1
system LED 1-7

T

table-mounting 2-17
technical specifications A-1
telco racks 2-14
Telnet, and accessing the CLI 1-21
temperature, operating A-1
transceiver troubleshooting 4-3
troubleshooting
bad or damaged cable 4-2
connection problems 4-2
diagnosing problems 4-1
Ethernet and fiber cables 4-2
link status 4-2
ping end device 4-4
PoE connections 4-3
port and interface settings 4-3
POST 4-1
serial number location 4-6
spanning tree loops 4-4
speed, duplex, and autonegotiation 4-4
switch performance 4-4
transceivers 4-3
with LEDs 4-1 to 4-2
troubleshooting spanning tree loops 4-4
TwinGig Converter Module
See Cisco TwinGig Converter Module

W

wall-mounting
attaching brackets 2-15
Catalyst 3560E-12D switches 2-16
warnings
Class 1 laser 2-3
code compliance 2-4
connecting outside of building 2-4
connecting the power 2-3
DC power 3-4
disposal of product 2-4
ground connection 2-3, 3-5
installation 2-1
lightning activity 2-2, 3-2
overheating 2-2
PoE shock hazard 2-4, 2-27
preventing bodily injury 2-3, 2-10
removing jewelry 2-2
removing power from DC circuit 2-3
restricted access area 2-3
RPS connector cover 2-2
servicing equipment 2-3
shielding Ethernet cables 2-2
stacking equipment 2-2
wall-mounting 2-2, 2-15
weight A-1

X

X2 transceiver modules
described 1-5
installation 2-19
removing 2-22
See also 10-Gigabit Ethernet module slot